A CHILTON PUBLICATION

the Iron Age

NATIONAL METALWORKING WEEKLY

March 12, 1953

TS PAGE 2

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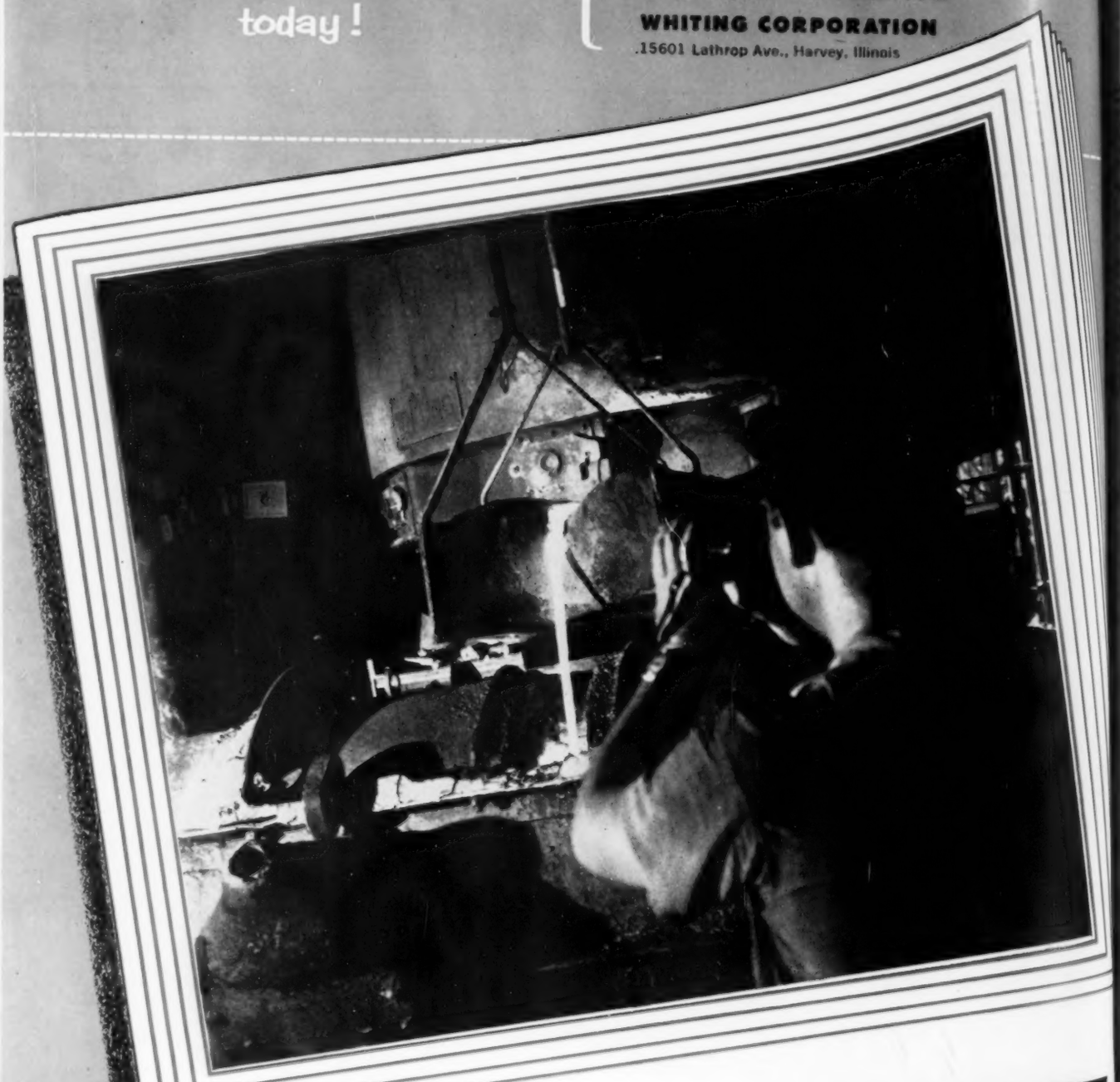

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What Next?

JOSEPH STALIN was personally responsible for the death of millions. He killed hundreds of his friends in purges. He controlled 15 million human beings as slave labor. He deified himself. There is no question but that he was the Devil reincarnated.

He is dead. Let us spend little or no time talking about him. The praise given him by some people of the free world—for diplomatic purposes—was hypocritical. There is no compromise with decency.

Current speculation about what will happen now can be nothing but pure guesswork. The Russian dictatorship has only told people or let them see what they wanted them to hear or to see. The best we can do is surmise what may happen. But we must be prepared for anything.

It is probably true that Stalin's successor will not have the experience in murder and doublecross down to as fine a point as did the master. But he will ape him until he finds new and better ways—if such things are possible. It is only a matter of time until the new master of the Communists will use the tried and true formula of evil.

It may be that Stalin did hold the hot-heads in check. If he did it was only because he believed he could get his way with more misery to all and cheaper gains to him and his communistic cohorts.

For a fleeting instant one could be captivated by the good Stalin could have done had he used his talents for the benefit and dignity of human beings. But he didn't. It may be that the free world has gained by his death—only time will tell.

It would be foolish to think that those under the communistic yoke and those fighting it can now breathe easier. This is no time to relax our caution. It is a time to become stronger; to move more quickly towards that day when we can have peace backed by the power to impress the bullies of the world.

It is imperative that we remember what President Eisenhower has said: "A soldier's pack is not so heavy a burden as a prisoner's chains." The price of freedom comes high. The accounting is written in patriotism, blood, work and self-sacrifice.

Tom Campbell

Editor

■ Phantom view of steering system and trailing axle in Baker Fork Trucks

1853 THE BAKER-RAULANG CO. 100th anniversary 1953 THE BAKER-RAULANG CO.

The most maneuverable fork truck

■ Maneuverability ranks high among features essential to efficient fork truck performance. Finger-tip control of steering, ability to make sharper turns and operate in narrower aisles, complete accommodation to uneven roadways, effective snubbing of road shocks — these are some of the qualities engineered into Baker fork trucks which make them the most maneuverable in their class — and less fatiguing to the operator.

Automotive type steering assembly with ball-type joints and anti-friction bearings in the steering linkage give you a truck as easy to handle as your automobile. Proper steering geometry minimizes "scrubbing" of tires. The wide-angle steering axle is mounted longitudinally in jumbo-size rubber blocks. This absorbs road shocks and provides constant, smooth traction and travel despite the most adverse floor conditions.

Write for *your copy of the "Baker Handling Library" a new portfolio of actual case histories.*

THE BAKER-RAULANG COMPANY
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The Baker-Lull Corporation • Subsidiary, Minneapolis, Minn.
Material Handling and Construction Equipment

Baker®
industrial trucks

Dear Editor:

Letters from readers

Depression Hints

Sir:

Your editorial "How To Start A Depression" is extremely thought provoking. More than thought provoking, it is extremely timely as well.

If you have copies of this editorial suitable for distribution, we would like to do our part through circularizing the point of view and thoughts expressed in that article.

R. C. SINGLETON
Mgr. Industrial Sales Div.
Nelson Stud Welding Div.
Gregory Industries, Inc.
Lorain, Ohio

This Is America

Sir:

With apologies to Ripley, but "believe it or not" this is my first fan letter; I believe I am due one, being past sixty-five.

My reason for taking this step is due to your editorial "This Is America." It is also purely American for an editor of a steel and iron publication to write an editorial of this nature wherein the fundamental human characteristics are so completely expressed.

It is also American to forgive, hard as it may be, the acts of ex-President Truman by enumerating his personal actions to indicate that in spite of all of his faults he is a human being.

A. C. LEIGH
Naval Architect and Marine Engineer
Ingalls Shipbuilding Corp.
Pascagoula, Miss.

Plastic Dies

Sir:

We are quite interested in your article entitled "Short Runs at Low Cost with Plastic Tooling," and would like very much to get in touch with Rezolin, Inc., whom you describe as the manufacturer of the material suitable for dies.

Would you please give us the address of the manufacturer.

D. R. FOSTER
Purchasing Agent
Midwest Metal Stamping Co.
Kellogg, Iowa

The address of Rezolin, Inc. is 5736 W. 96th St., Los Angeles 45, Calif.—Ed.

House Organs Useful

Sir:

We read the article "House Organ: Does It Tell Your Story?" in your Feb. 12 issue. The article covers in some detail how one company launched a campaign in its employee magazine to cut down loss and breakage of safety glasses.

We would like to have the name of this company so that we might get further information from them since we are intensely interested in the same problem.

U. D. CLARK
Safety Supervisor
Dow Chemical of Canada, Ltd.
Sarnia, Ont.

The company is E. I. du Pont de Nemours & Co., Wilmington, Del. and their employee magazine is "Thread Lines."—Ed.

Clarification

Sir:

In your Jan. 1 issue there is an article entitled "New Stainless Passes Its Tests." We enjoyed this article very much and we feel that it was most informative.

We question, however, the statement that the "new grade has a tensile strength of 10,000 psi less than 301 in similar tempers." We believe that this is probably a typographical error and that you mean 100,000 psi.

We would appreciate your advising us, however, on exactly what tensile strength is intended.

P. G. PARK
Wind Turbine Co.
West Chester, Pa.

What we meant to say was that the new grade will have a tensile strength of 10,000 psi less than 301 stainless for the same temperatures. This means that if a ½ hard 301 stainless had a tensile strength of 65,000, the new grade in the ½ hard condition would have a tensile strength of about 55,000.—Ed.

Drafting Dividends

Sir:

The interesting article on p. 80 of the Feb. 12 issue appears to have wide application within our organization.

As I am currently engaged on a cost reduction program for engineering personnel, I would appreciate further information on how to reduce drafting time.

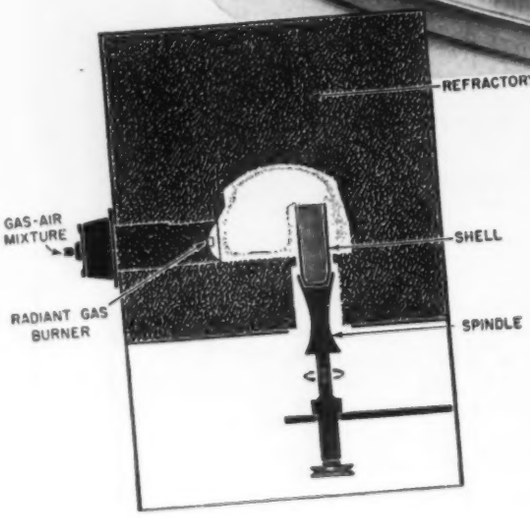
Will you please inform me whom I may contact at General Electric to obtain more details of their program.

H. PAGET
Supv. Indirect Labor Section
Ford Motor Co. of Canada, Ltd.
Windsor, Ont.

Write to Harry A. Winne, vice-president of engineering, General Electric Co., Schenectady 5, N. Y., for more information.—Ed.

Savings In Time, Space, Fuel And Operations Result From "HEAT PROCESSING"

A Gradiation CASE HISTORY



Shells are rotated while on a dial type conveyor. Spindle height is designed to allow the heating only of that section which is subsequently tapered.

CHANGE IN ANNEALING TECHNIQUE IMPROVES WORKABILITY OF STEEL

Now 81 mm mortar shells are being annealed at normalizing temperatures . . . *with Selas radiant gas heat.* Subsequent tapering requires only one operation instead of the two formerly needed.

Annealing is a part of the production line . . . time and labor of inter-departmental handling is saved, since no separate heat treating department is necessary. The Selas furnace requires only a fraction of the floor space used in previous methods. Shells are heated to 1750° F in 1¾ minutes while in a rotating fixture . . . then air cooled . . . no soaking period.

Fuel costs are low . . . 672 shells treated per hour with 990 cubic feet of gas. One man loads and unloads the work. No special atmosphere is required . . . furnace develops its own atmosphere for minimum oxidation.

Continual Selas research and development is producing additional improved processes . . . for metal melting, brazing, forging and other heat treatments. Would you care to investigate them?

SELAS

CORPORATION OF AMERICA • PHILADELPHIA 34, PENNSYLVANIA

Heat Processing Engineers for Industry • Development • Design • Manufacture

The Iron Age
FOUNDED 1855

THE IRON AGE Newsfront

A MECHANICAL MOLE will be used in what is believed to be the first project in this country for threading a continuous coil of plastic pipe underground without digging a trench. Project is scheduled for this spring.

CUTS IN MANUFACTURERS' AND RETAILERS' EXCISES, when they come, will be on a selective, product by product basis. Congressional tax-writers have unofficially ruled out proposals to legislate across-the-board reductions.

DON'T EXPECT SCRAPPING of many surplus World War II cargo ships in the near future. Bumper wheat crops have filled government warehouses to overflowing. Plan now is to fill surplus bottoms with surplus wheat, anchor them in Hudson and other rivers.

USE OF METAL CONTAINERS BY THE FROZEN FOOD INDUSTRY has increased 750 pct in the last 2 years. In 1952 the industry used more than 50 million cans, compared with 6 million in 1951.

RADICAL CHANGES IN BODY DESIGN may result from recent testing of the effects of cross winds on automotive stability. Tear drop body shapes are unsatisfactory. Car bodies need more stabilizing surfaces toward the rear to bring together the centers of pressure and gravity.

COMMUNISTS IN KOREA use unmachined carbide cores in their armor piercing projectiles. U. S. Ordnance, which originally used unmachined cores, now requires they be machined for better balance—greater accuracy. Reds may lack adequate machine shop facilities.

AN END TO GASOLINE FUMES IN CITIES is a definite possibility with a new catalyst which can be attached to automotive exhausts. Previous catalysts would not work on leaded gasoline.

MORE LARGE, HEAVY AIRCRAFT ENGINE PARTS WILL BE TUMBLED in the future. Fine surface finish required has, to now, made costly hand finishing a must. Much thought is being given to tumbling of these parts. Most striking success has been attained with large, heavy parts fixtured in the barrels.

HELICOPTER BUILDERS WANT ENGINE MAKERS to develop more units specifically for helicopter operation. Further helicopter advances would be easier, builders say, if they could count on having engines made to fit their designs rather than having to fit designs around the engines.

FIRST QUARTER BUSINESS FOR FASTENERS points to an excellent first half. Possible exception is heavy bolts where steel bars have proven a limiting factor in sizes over 1 in. Despite January lulls, first month business for some concerns was 15 pct over last quarter 1952.

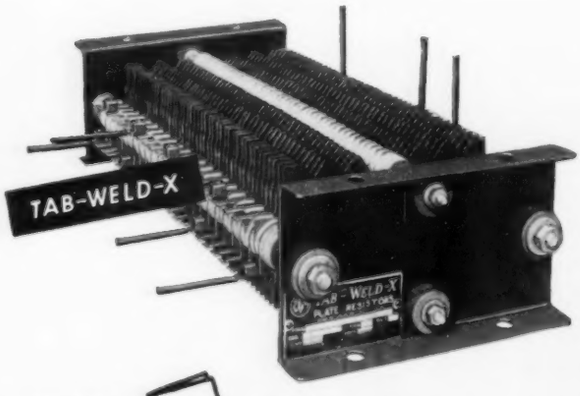
COMBINED TRUCK-RAIL SERVICE which would ship loaded truck vans on flat cars over long hauls is still holding fire. Contracts for 500 special flat cars needed have not yet been let. Some railroads require selling on the idea.

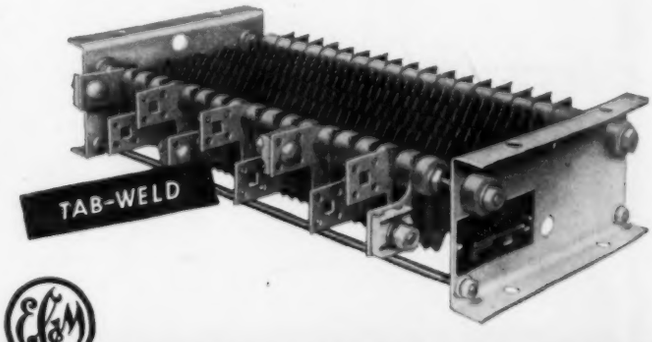
low priced yet...it includes Preventive Maintenance

"F. O. B." (FREE-OF-BURNING)

Resistors get little attention, because they are usually mounted overhead or in similar hard-to-reach locations. Clamping-nut pressure slackens under alternate heating and cooling. Formerly, under the reduced pressure, OHMIC value changed, burning occurred and often was *not* noticed until damage took its toll.

But — note how resistor troubles are now eliminated in the EC&M TAB-WELD design! The current-carrying path is continuous — and is *independent* of end clamping-nut pressure. Convenient tap-plates simplify tap-shifting—make possible small adjustments in resistance value, because plates are closely spaced. Also, these alloy-steel resistors are corrosion-resisting—and have negligible resistance-change between cold and maximum working temperatures.





SPECIFY BULLETIN 942 EC&M Welded Plate Resistors

THE ELECTRIC CONTROLLER & MFG. CO.
2698 EAST 79TH STREET • CLEVELAND 4, OHIO

PIPE: Plastics Stir Steel Firms' Interest

Steel producers take options on plastic pipe reinforced with glass fibers . . . Oil country use seen possible . . . Has high strength, resistance to corrosion—*By W. V. Packard.*

Some steel firms may find themselves in the plastics business before too long, if present development work is as successful as anticipated by researchers.

Several big steel producers have already taken options on a new process for producing plastic pipe reinforced with glass fibers. Reflin Co., Gardena, Calif., which pioneered the process in 2½ years of development work, has been producing the centrifugally cast thermosetting plastic pipe since last June. Patent on the process is pending at the present time.

Turning All Stones

But, true to form, steel firms are not putting all their eggs in one basket. Some of the same companies with options on the Reflin process are keeping a watchful eye on expanding development and use of Tenite extruded thermoplastic pipe. A full discussion of this pipe appeared in THE IRON AGE Aug. 17, 1952, p. 67.

Samples of the pipe on which steelmakers have taken process options were on display at the 8th Annual Technical & Management Conference, Reinforced Plastics Div., Society of Plastics Industry, Inc., in Washington recently.

Withstands Greater Pressure

Outstanding features of the reinforced, thermosetting plastic pipe are: (1) good corrosion resistance, (2) wide temperature range, (3) high working and bursting pressures, (4) very high flow rate, (5) toughness and abrasion resistance, (6) ease of handling and installation.

Temperature range for continuous duty is between minus 90°F and plus 230°F. Low heat transfer rate permits transmission of hot or cold liquids with very little change in temperature.

Working pressure is 200 psi; bursting pressure is 1000 psi for standard wall thickness. Strength is directly proportional to amount of glass fiber used as reinforcement. Standard Reflin pipe is 47 pct glass fiber. By increasing the percentage of reinforcing glass fiber the company has turned out pipe for military use for operating pressure of 600 psi and bursting pressure of 3000 psi.

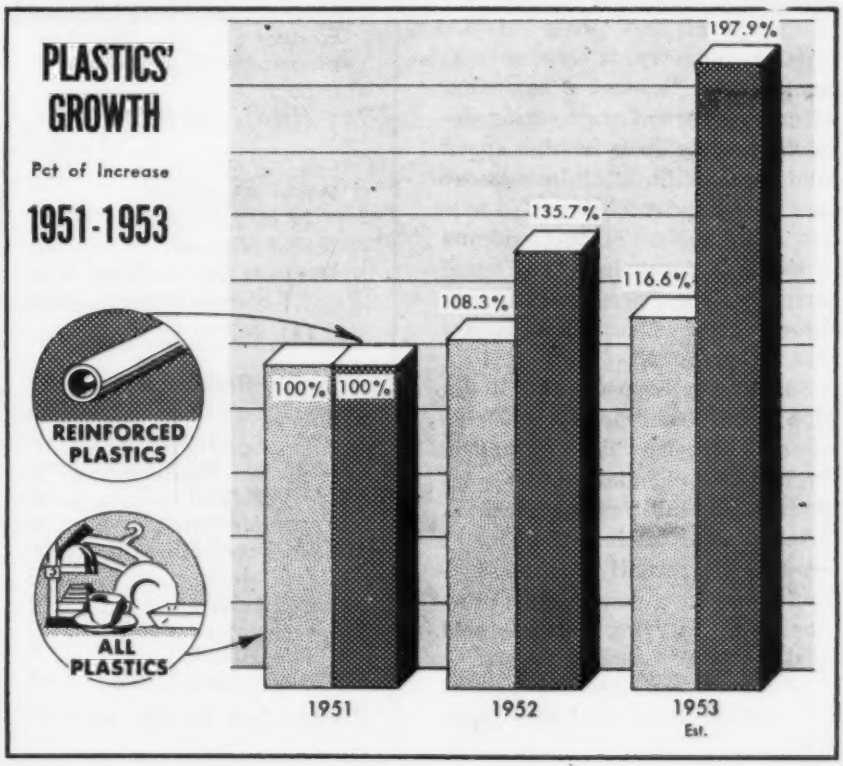
Although present production is limited to 4, 6, 8, and 10-in. sizes, future plans call for broadening the size range up to 36 in. OD. Tanks will later be added.

Firm is currently producing a mile of pipe of any one size per day with less than a dozen workmen. Raw material supply is adequate. Since only one oven is in use, making one size of pipe at a time, changing size requires a new production set-up.

Doesn't Tell All

In order to save much time lost in changing set-ups for various sizes, installation of three more furnaces is planned. This will permit continuous production of four different sizes at the same time. Future plans also call for building of two new plants, one in Oklahoma or Texas and one in the Chicago area.

Although Reflin President Louis



Potomac declined to reveal names of interested steel firms or details of his production process, this much can be told: Materials handling is mechanized; glass fibers (cut into 2-in. lengths) are drawn onto a conveyer. They are combined with yardage goods impregnated with polyester resins.

Fast Flowing

After centrifugal casting and curing in a furnace, the chopped fibers, now an integral part of the structure, are clearly visible on the outer surface of the pipe. Inner surface shows a thin layer of unreinforced plastic which gives a flow rate (C Factor) of 160 (100 is considered good).

Although the smooth inner surface of unreinforced plastic adds practically nothing to strength, it permits high and constant flow rate with economy in pumping.

Elasticity permits pipe to expand within itself, obviating need for expansion joints. Water can be frozen inside without changing the plastic pipe's physical or chemical structure.

Cheap to Start

One of the reasons for fast development of this phase of the plastics industry is low investment needed to start a company. After 2½ years of engineering development, Reflin is in high speed production with total investment only now approaching half a million dollars. Mr. Potomac said one of the half dozen interested steel companies is "prepared to put three-quarters of a million dollars into the product."

So far, applications of Reflin pipe have been mostly in fields where corrosion is a problem. Typical are chemical and oil industries and military applications. After careful testing, the City of Los Angeles recently adopted Reflin for use in a new steam generator plant carrying sulfuric acid treated water to cooling towers.

In the oil industry the pipe is used for salt water and sour crude oil lines.

Lack of a satisfactory coupling is presently a deterrent to heavy duty oil country applications, such as drill pipe. The company is marketing a resin-wrapped trademarked coupling, which, though adequate for other applications, will not meet requirements demanded of oil country goods. Efforts to develop a better coupling are being continued by Reflin and other interested firms.

Production and sale of plastic pipe by steel producers would seem a logical move. Their biggest advantage, of course, is in their far-flung and well organized sales forces which have built up enduring customer relationships.

While continuing to expand their facilities for making steel pipe to meet growing demand, steel people aren't missing any bets on other possible ways of filling needs of their customers.

Market Growing Fast

With keenest interest they have been watching rapid fire developments in plastics—which in little more than a decade has quadrupled in size to become a billion and a half dollar industry. They could not be unmindful of the fact that some of this business has been built up in applications formerly using metal. Nor could they help wondering just how big the plastics market will turn out to be.

Production of plastics raw materials in 1952 totalled about 2.6 billion lb, compared to 2.4 billion lb in 1951. Dollar value of goods manufactured from plastics in 1952 was $1.4 billion, compared to $1.3 billion in 1951.

Using More Material

This year it is estimated that 2.8 billion lb of plastics raw materials will be produced and converted into manufactured products valued at $1.5 billion.

While nearly all segments of the plastics industry were expanding last year, reinforced plastics enjoyed a production growth of 40 pct. About 19 million lb of polyester resins were consumed, compared to 14 million lb in 1951, 9 million lb in 1950, and 7 million lb in 1949. Last year about 11 million lb of glass fiber was used with polyester plastic.

This year another 40 pct gain to about 27 million lb is forecast for polyester plastics in the reinforced field. Proportion of glass fiber is expected to increase (because of recent improvements) to well over 16 million lb.

Dope Sheet on Reflin Pipe

Size, Weight, Price

OD in.	Wall Thickness in.	Est. wt., lb. per ft	Price per lin. ft
4	0.125	0.97	$2.35
6	0.188	2.15	4.41
8	0.250	3.88	7.18
10	0.313	6.07	10.82

If maximum pressure and temperature range are not required prices are about half list.

Physical Properties

Tensile Strength	16,000 psi
Compressive Strength	22,000 psi
Flexural Strength	38,000 psi
Modulus of Elasticity	2.5×10^6
Impact (Izod)	15 ft/lbs. per in. of notch
Specific Gravity	1.55
Water Absorption 24 Hr L-P-406-A	0.3%
Barcol Hardness	40
Thermal Conductivity: K= 1.5 Btu per hr per in. thick per degree F.	

Chemical Resistance

Salt water	E
Aliphatic Hydrocarbons	E
Aromatic Hydrocarbons	E
Mineral Oils	E
Vegetable Oils	E
Chlorinated Solvents	P
Dilute Acids	E
Fatty Acids	E
Concentrated Acids	F
Dilute Alkalis	F
Concentrated Alkalis	P

E—Excellent F—Fair P—Poor

STUD WELDING: Speeds Parts Processing

Lugs welded to hard-to-handle parts for easier materials handling . . . Removed with air chisel . . . Semi-automatic stud welding gun makes process fast, cheap—By *R. M. Lorz.*

The metalworking industry is putting "handles" on steel to speed up the flow of materials. Latest application of the stud welding technique was unveiled by National Tube Co. at its new "hot extrusion" mill in Gary.

NEXT WEEK . . . THE IRON AGE will present a detailed on-the-spot description of National Tube Co.'s hot extrusion line at Gary. Many details of operation and auxiliary equipment will be published for the first time—Ed.

To save furnace space and facilitate handling of stainless steel billets by overhead conveyer, National Tube has installed a semi-automatic electric arc welding gun on the new extrusion line. Gun attaches a specially headed flux-filled stud to stainless slugs before they are suspended and carried through furnace and salt bath to the extrusion press.

Chiseled Off

Since furnace and bath heats range up to 2400°F, positioning of a mild steel stud demands a strong weld. Studs in use at the Gary mill range in diameter from ¾ to ⅞ in. with heads 1¼ to 1½ in. depending on the size of the stainless slug. After the slug leaves the salt bath and is ready for extrusion the welded stud is quickly removed with an air chisel.

Stud welding as applied to billets is new but the use of welded handling aids in general has been gaining wide acceptance in the steel industry within the past 3 or 4 years. In addition to general construction and maintenance in mills, stud welding is being used to retain ram-type insulation on openhearth doors and on skid tubes. Hazards of banding coiled strip have also been eliminated through the stud welding of fish tails.

Mill men claim no monopoly on materials handling problems and metal fabricators will second the motion. Their desire to speed up manufacturing sequences has resulted in a swing to welded extensions to make handling easier. Available variety of hooks, hangers, and other attachments, plus simplicity and economy of light weight welding are making the change profitable.

Chain-O-Flex Corp. of Chicago provides a good example since the firm is using stud welding to equip overhead chain conveyers with welded J hooks. Hooks, which carry everything from television tubes to combustion engine parts, are spaced on the conveyer line quickly by welding.

Solves Solution Problem

Producers of galvanized tanks, slowed down by pickling and galvanizing steps, might profitably steal a page from the operations manual of The Combustion Engineering-Superheater Corp. The Chattanooga firm claims stud welding came to its rescue by eliminating solution drainage problems during production runs.

Like many producers of automatic gas and electric hot water heaters, Combustion Engineering had been punching an extra hole in tank heads to handle vertical dipping. System worked, but once hand welded ½-in. pipe had been removed a screw cap had to be inserted and possibility of leakage became a factor.

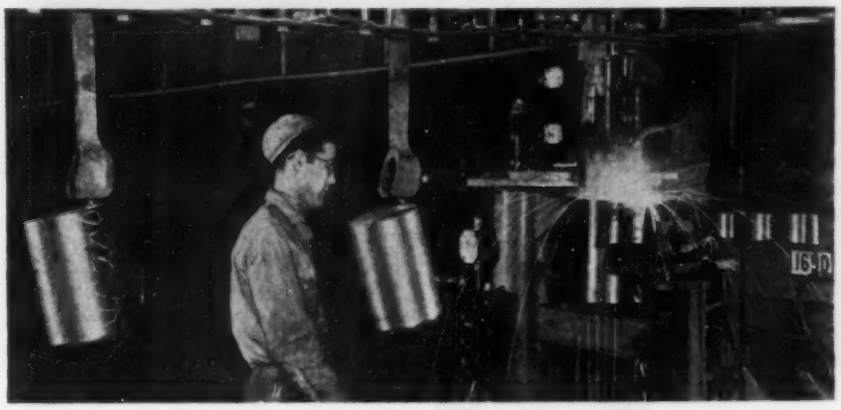
Welding of an eye bolt to the top surface of the heater tank has not only insured better drainage but also makes batch dipping possible. Customers should also get a "leakage" bonus since eye bolt can be snipped off after galvanizing without impairing surface of the tank.

Cuts Handling

At Ravenna Arsenal in Wayland, Ohio, powder cans and metal containers for shells are being processed in much the same manner. In this operation cylindrical sheet steel containers are suspended from an overhead conveyer for spray painting. Minimum handling is achieved at the Ravenna Arsenal by stud welding a ⅝-in. attachment to the concave bottom of the can.

The stud accommodates a wire which then can be attached to the conveyer.

Greater efficiency and savings have also been achieved through use of stud welding on jet turbines. New application features stainless steel studs which are welded to jet turbine blade forging blanks to expedite tong handling. Highly expensive alloy lugs have been eliminated by this operation.



WELDED STUDS speed billet handling at National Tube's Gary plant.

STRUCTURALS: Made Lighter for Homes

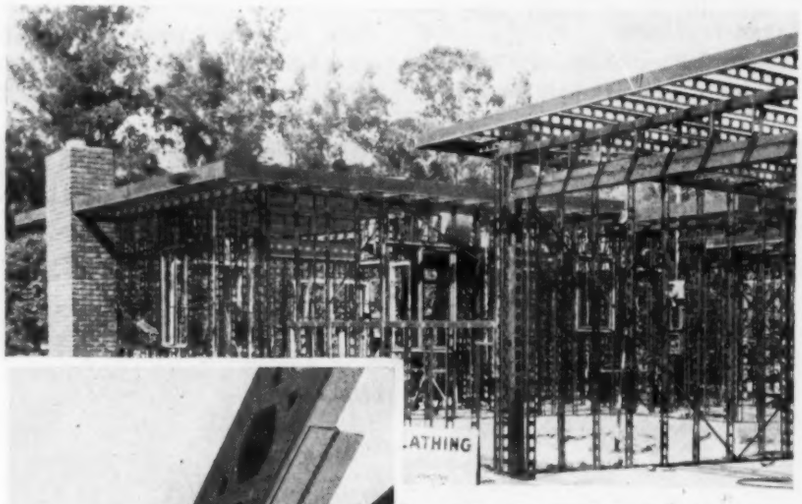
New cold-rolled sections make it possible to build all-steel homes, other small buildings . . . Open web design cuts weight . . . Higher costs balanced by construction—By E. C. Kellogg.

Skyscraper construction of small homes is now practical because of a new line of lightweight steel sections developed by Penn Metal Co., New York. Usually steel framework is not specified for light construction because it costs too much and is too hard to handle.

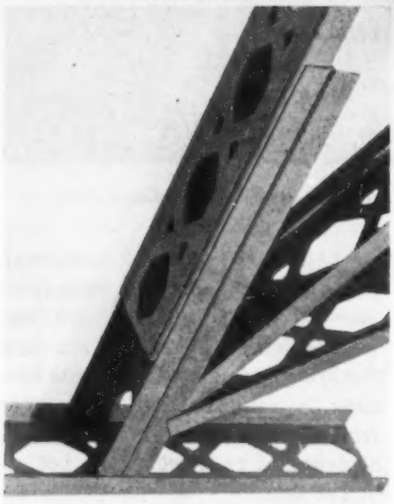
But rising cost of wood and cement in some areas has eliminated steel's price handicap by making steel construction of small buildings relatively more competitive. In other sectors where wood and cement prices are considerably less than steel, the advantages of steel construction compensate for the difference in cost.

Penn Metal has tackled the weight problem by punching holes in its cold-rolled sections. This makes them lighter and easier to handle but does not reduce strength materially.

As a result, the company now has a line of Lightsteel sections that can be used for studs, rafters, joists, sills and other components needed to build a light, all-steel frame structure. Penn Metal hopes its new line will find application in small homes, stores, garden-type apartment houses, small factories, schools and garages.



ONE OF FIRST small homes with Lightsteel framework erected at Fontana, Calif.



OVERSIZE sections make it possible to overlap three double studs for installations requiring stronger sections.

Lightsteel was first tested in the Los Angeles area last June. Active pushing of the product started two months ago, and the company reports it already has a month's backlog of distributor's orders.

Lightsteel is being marketed through distributors in all parts of the country. At present 30 distributors are handling Lightsteel and 30 more will be added soon.

Though Penn Metal is not in the prefab building field and Lightsteel is specifically designed for custom framing, the company is angling for contracts to supply prefab manufacturers.

More than 100 Lightsteel buildings have already been erected, including a string of motels in North Carolina. The company estimates this figure will hit 2000 by the end of the year.

Sections Cut to Order

Production at Penn Metal's 400-man plan in Parkersburg, W. Va., is 200 tons per day. The company does the complete fabricating job on its steel sections, cold-rolling and punching strip steel at the rate of 200,000 ft per day. Sections are available in 3½, 3⅝, 4, 6, and 8-in. widths in 14 and 16 gage steel. Lengths are precut to order. Weight of a 3¼-in. wide section is less than 14 oz per ft.

Price is still Lightsteel's main drawback, though the advantages of steel construction balance this factor. Cost of steel framework for a 6-room ranch-style home requiring 3 tons of Lightsteel is about $1000.

Around New York, which is one of the most favorable price areas for Lightsteel, the cost of different materials per sq ft of completed wall with a stucco exterior are, according to Penn Metal: Wood frame, 96¢ per sq ft; cement block, $1.00 per sq ft; Lightsteel, 96¢ per sq ft.

On a nationwide basis, however, steel construction is more expensive than either wood or cement.

It Can Compete

Penn Metal is not unreasonably optimistic in believing that its price disadvantage will not force Lightsteel off the market. Builders have long been familiar with the advantages of steel construction such as: It's fireproof, won't rot, warp, shrink or split, it doesn't crumble, is termite-proof, and can better resist earthquakes.

Because of these advantages, Penn Metal is confident that it will snare a fair share of the $20 billion-per-year light construction business.

SHELLS: Ordnance Raises Its Sights

Hopes to double dollar volume of ammunition production by third quarter . . . Brings out new spiral wrap cartridge cases . . . Go into production stage very quickly—*By K. W. Bennett.*

While there have been cutbacks in procurement by several service branches, the Army Ordnance ammunition program is kicking at the traces like a colt. Raw material steel purchases of bars, plates, and now sheets are pushing over last year's levels. Military planners have now set their sights on a really hefty boost by midyear.

With the new facilities either in production or ready to produce shell components, it is quite probable that Ordnance dollar volume of ammunition production will double present levels by the third quarter.

New Model Enters

And like the automotive firms, the Army's shell makers have introduced a spanking new spring model. The spiral wrap cartridge case is now at the production stage. (Initial announcement of this development was reported by THE IRON AGE last spring.)

Fashioned of .032 gage steel in 1010 and 1020 analyses, the case is formed by rolling a single or double 36 in. wide trapezoid into a cylinder and fitting this into a forged base plate.

Brass Case Exits

At least three firms are already producing the item under contract, and two or three more will probably enter the program within months.

Meanwhile the steel cartridge case has superseded almost entirely the brass case. An educated guess would put brass case production at less than 10 pct of total cartridge case output.

Heaviest steel case tonnage is in drawn cartridge cases which will continue as a strong source of supply. Drawn cases are currently consuming about 26,000 tons per month of hot-top quality steel in 1030 analysis.

Is There A Shell Shortage?

Ammunition supply became a storm center in Washington last week when Gen. James A. Van Fleet told the Senate Armed Services Committee that ammunition shortages had hampered his command in Korea.

Angered by what he heard, Sen. Harry F. Byrd, D., Va., wrote Defense Secretary Charles E. Wilson demanding a complete investigation of the charges, with punishment of any officers found guilty of negligence. Mr. Wilson replied that he had already studied the Korean ammunition situation and disputed Gen. Van Fleet's charges.

Congressional leaders indicated they were preparing to investigate the ammunition supply problem fully, but generally opposed Sen. Robert A. Taft's proposal for a full-dress inquiry into the conduct of the war.

This figure can be expected to climb much higher by June. Plate thickness ranges from .450 to .720. Chief bottleneck here has been obtaining furnace space for the spheroidizing anneal.

Soaking pit capacity has long been a tight pinch in production of hot-top quality steel, but Ordnance has indicated that the far tougher production problem is the 90 hr spheroidizing cycle and furnace capacity to handle it.

How Much Steel

For projectiles, or "shells" in Ordnance parlance, current steel consumption rates are estimated at about 120,000 tons per month or better than 360,000 tons per quarter. This is largely in MIL-S-10520-B stock and in billets and rounds ranging from 2⅞ in. up to 10 in. diam. Some leaded steel in bar form is going into fuze parts.

Shell billet steel is now coming from 20 mills and is being processed by more than 50 forgers and extruders. Projectiles are being forged, cast, cold extruded, and "hot cupped."

Current consumption of cold-rolled sheet for the spiral wrap case is reported "negligible" and the process is still somewhat more costly than the drawn case. (Wrap case currently costs about $4 per unit, the drawn case costs about $2.65. Both compare very favorably with the old brass case rated at $4.00 per unit at current prices.) Spiral wrap cases are expected to sink in cost as manufacturing techniques are refined.

Lick Expansion Problem

The new sheet steel case is sprayed, dipped, or roller coated with a thin baked phenolic coating. The old expansion characteristics that made it a doubtful quantity in the German World War II arsenal are being overcome. The German artillery private sometimes had to ram the cartridge case out of the gun's breech by driving in a long pole from the muzzle end.

The base plate for the spiral wrap shell is forged from a hot-rolled bar in 1030-1040 analysis, preferably. Base plates have been machined but cost is high.

Speed on Spiral Wrap

Though there has been criticism of Ordnance ammunition deliveries from some quarters, the speed with which the spiral wrap case has been brought to the production stage is impressive.

An estimated 8 pct of 105 mm cases produced this month will be spiral wrap. And the wrap case takes a little of the pressure from the already tight spheroidized (bar) supply.

Powder to fill the new shells is available in adequate quantities, thanks to a substantial cushion of reserve powder stocks. Current rehabilitation of World War II powder manufacturing works to be completed this year will keep powder supply in step with the general increased output of ammunition.

NEW FINISH:

Glidden shows new one-coat enamel . . . Claim high flexibility.

"You can't hammer it off." That's the claim Glidden Co. made in Cleveland recently while demonstrating its new one-coat industrial finish, Nubelon S.

Glidden researchers who worked for 5 years to develop the silicone resin based enamel say it is 50 pct harder than standard coatings yet flexible enough to permit metal forming after finishing.

Competes With Porcelain

Developers say increased hardness and retention of flexibility make Nubelon S a natural competitor of porcelain and galvanizing in some applications.

Extreme flexibility and adhesion were demonstrated with a piece of ordinary fence wire twisted almost to the breaking point without chipping the coat.

Chemists also subjected the new semi-organic baking enamel to rigorous corrosion and staining tests. Resistance to dyes, mustard stain, lipstick, coffee and fruit acids proved excellent.

Corrosion tests conducted in a 20 pct salt solution "fog" for 4000 hours left no noticeable marks. Nubelon S also withstood pounding of a sharp ball-peen hammer without chipping.

Experimenters say new finish has shown excellent resistance to crude oil, formaldehyde, ammonium nitrate, carbon tetrachloride and diethyl hexoic acid.

Consider Market Possibilities

Retention of color, extreme hardness and adhering power promise to make Nubelon S a real competitor in the white appliance field.

Company officials admit the new finish is more expensive and requires baking at 425°F, but feel other advantages outweight these factors.

Possibility of using Nubelon S on automobiles is one topic for discussion. But wary Glidden officials feel there are still too many bugs to be eliminated before the new product can be considered a boon to the automakers.

PROPAGANDA: Industry Wages Own War

Taking State Dept. cue, industry collects, ships magazines and literature to let world know America . . . Transocean flies magazine cargo . . . No comics, girlie magazines allowed.

Communist agents in Beirut, Lebanon, put up a propaganda billboard recently. It showed the photographic "facts" of life in Russia and called out that the people of Lebanon had been befriended by the Reds. Propaganda of this type is blowing hot all over the world and the State Dept. is today putting more reliance on American industry to counter it.

Fight War of Ideas

Formation of Private Enterprises Cooperation Program by the State Dept. was industry's invitation to help fight the war of ideas. There were plenty of takers and now almost 150 companies and publishing houses are shipping magazines, exhibits, and literature to Europe, South America, the Near East, and the Orient. With the State Dept. staying discreetly in the background, U. S. industry is letting the world know the truth about life and economics here.

Currently shipping magazines and literature abroad with their products and through their overseas facilities are such companies as International Harvester Corp., American Locomotive, U. S. Steel Co., Weirton Steel, Burroughs Adding Machine Co., Gorman-Rupp Pump Co. and many, many others.

What's Being Done

International Harvester, for example, supplies information material on U. S. life through 725 outlets overseas. Other firms ship thousands of copies of their house organs and big name popular magazines have contributed hundreds of thousands of newsstand return copies.

State Dept. people are enthusiastic. The idea outlets at their disposal are now countless—and the cost to the taxpayer is negligible.

Participating companies have on their own initiative undertaken other measures to sell America. National Cash Register has scholarships for students in Europe.

Republic Steel stresses America heavily in its overseas advertising. Standard Oil Development Co. is working up eight possible projects to further the campaign. Histories of American industries are going to Europe by the bushel. U. S. Steel shipped 10,000 copies of its publication, *Steelmaking in America.*

BUNDLE OF MAGAZINES is handed Stewardess Mary Lee Walker by Transocean Air Lines mechanic Cliff Howell. Magazines will soon be winging to overseas stations.

Bohn Aluminum & Brass Corp. supplied 5000 anti-Communist posters printed in Portuguese for distribution in Brazil.

On the West Coast an international airline began magazine distribution a few weeks ago. In the first 2 weeks about 50 bundles of popular magazines were deposited in collection barrels by the 1800 Oakland, Calif., employees of Transocean Airlines. Whenever there's a light air load, Transocean fills in with magazines. A week ago the first shipment was flown to Guam and Wake Island.

John Russell, Transocean's manager in Beirut who has kept an eye on the spread of Red propaganda in his territory, reports that the natives are eager for a look at American magazines. When passengers leave them behind, they are quick to be snatched up. New copies are sold in the country but prices range 50¢ and up per copy.

Prefer "Slaughter Comics"

Unfortunately, the reading taste of many world citizens is lowbrow. Some would love us more if we sent *Slaughter Comics* or girlie magazines rather than *Harper's* or *American Home.* But the State Dept. is pushing the idea that we are not shipping magazines and literature merely to amuse—and surely to build false impressions of American life.

When Transocean called on its employees to bring in used magazines, it advised that "detective stories, comics, and sensational material" cannot be used. Popular magazines with pictures are especially desirable.

The man who started the magazines for overseas program is John M. Begg of the State Dept. Two years ago he thought of finding "bonus" readership for American magazines and asked publishers if they'd turn over their unsold overseas copies for free distribution.

Turning Over Leftovers

At latest count these publications are turning over their leftovers: *Time, Life, Newsweek, American, Woman's Home Companion, Collier's, Reader's Digest.* Some publishers also make available some returns from U. S. newsstands.

Companies are encouraged to handle overseas distribution of the magazines they collect on their own but if they cannot, they can send magazines to the U. S. Book Exchange, 1816 Half St., S.W., Washington 25, D. C.

FASTENERS: Demand Strains Facilities

Work full shifts to meet strong demand . . . Some turn down orders . . . Automakers, air conditioners big customers . . . Prices should hold save for nonferrous items—By *K. W. Bennett.*

If fasteners are an index of current business activity, then business is good. Fastener manufacturers are reporting capacity operations, strong demand, and a strong outlook.

With machines straining at their floorbolts, and hiring of skilled employees a problem, most fastener producers nonetheless are not considering major increases in their capital equipment.

Run Full Shifts

Plants are operating full shifts, consumer demand is strong (some producers have actually turned away business) and defense orders are still strong. It appears that the majority of fastener producers are content to leave it that way, save where a long term expansion program is in progress.

Heavy buyers are automotive industries, heating and air conditioning. In a middle-demand area are appliance, radio, television and farm equipment. Reports in this category indicate that there are some hot selling spots, others where business is definitely off.

Reports on industrial trucks, construction equipment, and structural fabricators indicated their purchases were fair, but lacking the steam of first and second categories named above.

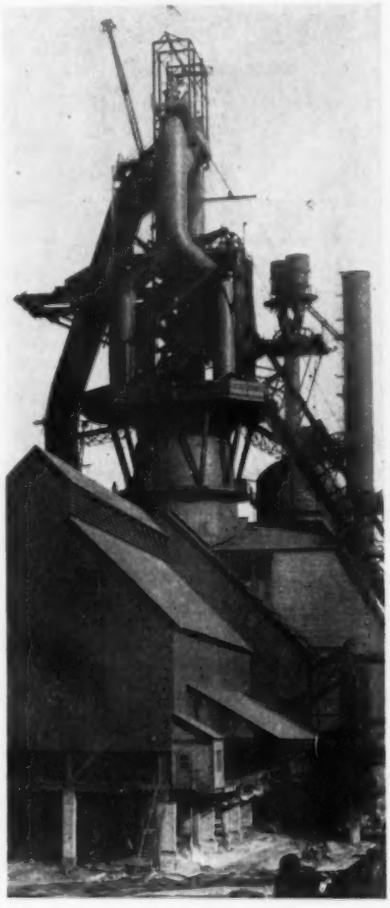
1952 Was Good

For fastener producers 1952 was a relatively good year. Beginning with a humming first quarter, they saw demand slip at mid-year, then revive to higher levels in fourth quarter and stay there.

Current demand indicates that first quarter 1953 is either equaling 1952's winter months or bettering them. Average deliveries, down to 6 weeks in mid-1952, are lengthening again and moving up to 8 weeks and longer.

Heavy bolts were indicating some weakness last week, but this is offset by a shortage of carbon bar in 1 in. plus sizes that will certainly prevent any glutting of the market. Stainless in 18-8 and nickel-chrome is tight, like the heavy bar, but selling forces do not find this a major problem.

Brass and copper are in fair supply, though price hikes here may have to be passed on to consumers of brass fasteners. At least one source counted on a 10 pct hike. In standard sizes of steel fasteners, feeling was that a competitive market would hold prices pretty much at present levels but a sharp spurt in raw materials costs could change this.



BLAST FURNACE No. 3, recently blown in at Youngstown Sheet & Tube's Indiana Harbor Works. Equipped with three stoves it has a 28-ft diam hearth, is rated at 1500 tons daily capacity.

Defense work is holding well. Percentages going into direct and indirect defense orders ranged roughly from 20 to 30 pct and were expected to stay at that level. Some sources indicate they'll avoid any further increase of defense production commitments.

Civilian Business Hot

Business in civilian products is hot. Structural fabricators' use of large bolts had fallen slightly, but Atomic Energy Commission construction orders have offset this. While larger fastener plants have been doing a good volume with aircraft manufacturers, feeling in smaller facilities is that Air Force orders are too small, are often in off sizes making production costs abnormally high, particularly on such short runs.

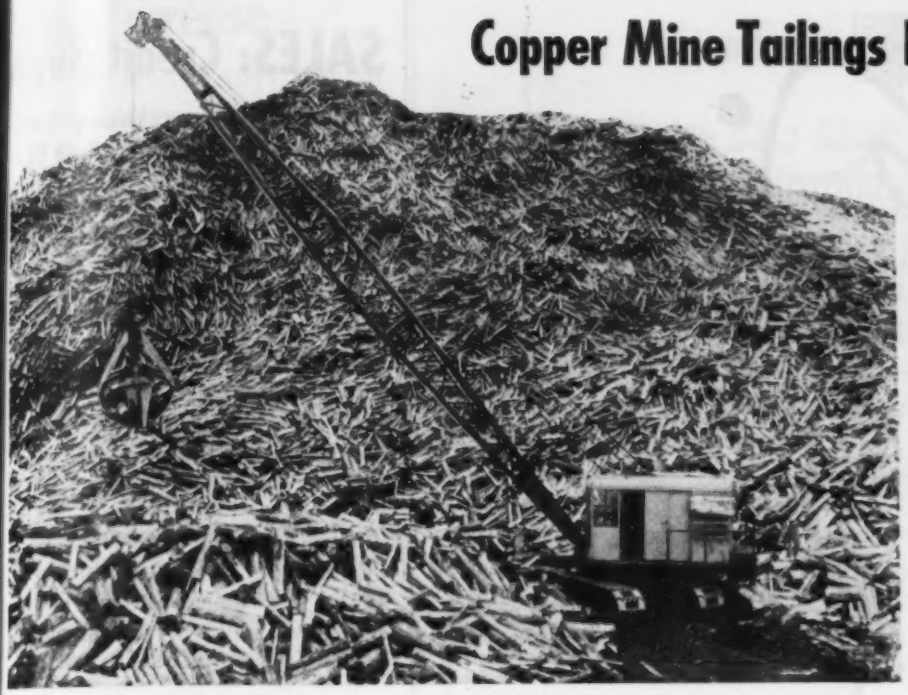
Meanwhile the bread-and-butter consumer is changing his tastes. More and more he's seeking "sems," more expensive per single unit but labor savers in that the washer and bolt may be purchased as a unit in one of several ways. Or he may prefer more expensive alloys, or two different metals in the same assembly of bolt and washer. His use of non-corrosives is greater.

Dollar Volume Climbs

Net result is that in at least one large plant tonnage of fasteners shipped has fallen off slightly, while dollar volume of sales has continued to climb with increasing shipments of more expensive units. The same plant has increased dollar volume by 15 pct in the last 4 months.

How long will these sunny days continue? Most sales managers indicate they're counting on heavy volume until at least mid-year. With a good volume of back orders to firm up these predictions, their selling position appears safe, even in an increasingly competitive market.

Copper Mine Tailings Help Make Paper



HUGE PILE of lumber would make a lot of toothpicks but it represents only a single month's supply for the Brown Co.'s paper mill operations.

It takes a lot of sulfur dioxide to make paper from pulp wood. Brown Co., Berlin, N. H., used to bring sulfur up from Texas to run its pulp wood processing plant. Now it buys tailings from Vermont Copper Co.'s South Strafford, Vt., mines, roasts the gas from the iron sulfide waste.

Tailings are cooked in a 16-ft-diam reactor at 1650°F to obtain the gas. They are hauled in gondola cars from the mine to the pulp mill, a distance of about 60 miles, in contrast to previous 3000 mile trip for Texas sulfur. Roasting plant is believed by Brown Co. to be the first of its kind in the U. S.

↑ LOADING MACHINES fill hopper cars with ore deep underground. Mine yields some 300 tons of copper a month.

← OPEN PIT mines of the Vermont Copper Co. at South Strafford, Vt. Holes in photo at left are drifts in century-old parts of the mines.

SPIRAL CLASSIFIER rotates copper ore and water to reduce it to powder. Series of grinding, crushing and flotation processes are used to obtain copper concentrates.

—Financial—

SALES: Credit Buyin

Installment purchasing freed by Reg. W death . . . Rose $5.1 billion last year from 1951.

Give the customer a break and he'll buy.

That conclusion is drawn from a consumer credit study issued this week by National Industrial Conference Board. The study finds that installment buying for consumer durables zoomed upwards in a hurry after Reg. W was lifted last May.

Yearly total for 1952 was $25.1 billion against only $20 billion in 1951. Installment buying in December of last year was up 30 pct from the same month in 1951.

Will It Last?

But the report warns it is still too early to tell how much of this rise is temporary. Much of the post-May buying could have been purchases by customers who had been waiting for the death of credit curbs.

Ratio of credit to cash sales has recently dipped slightly, but is still substantially above pre-May levels. Only time will tell how much of the rise has been due to backlog buying and how much is part of an overall upward trend.

Follows Trend

Statistically, the board notes, the recent upsurge in credit buying fits into the trend from cash to credit since World War II. For most consumer durable goods—automobiles, furniture, television and radio sets, appliances and jewelry—credit sales are close to prewar relationships to total sales volume.

Larger proportion of goods sold on credit, lower downpayments, longer installment contract terms are all looking more and more like prewar figures.

In fact, the board adds, proportion of consumer income currently being set aside to pay bills appears to be even higher than prewar: 9.3 pct in 1952, compared

n the Increase

with the prewar record high of 9.1 pct in 1941.

A major reason for the marked shift back to credit buying since 1945 has been the gradual depletion (in terms of purchasing power) of money saved during World War II by families who normally buy on credit. Since then, rising prices have cut purchasing power by about 15 pct. And consumer durables purchases have increased about 20 pct.

Cars Did It

Postwar auto sales are the main reason for installment buying growth, particularly since 1948, the report finds. Of the $14 billion rise in outstanding installment payments since 1945, $6 billion is owed on cars.

Fewer than 20 pct of new car buyers used time payments in 1946; in 1951 47 pct did. Credit buyers bought less than one-third of used cars sold in 1946. About 58 pct of these are now on time.

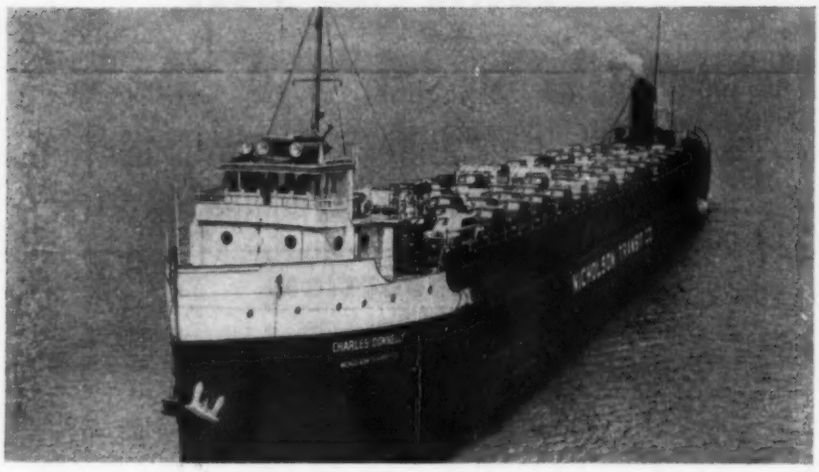
Installment sales of other durables are also up, but not so much. Shortly after World War II sales of furniture, appliances and department store items shifted to time purchasing.

But since 1948 the trend has been back to cash. Appliances stores reported 63 pct of sales on time in 1941, but only 49 pct in 1951. Installment sales accounted for 78 pct of furniture store business in 1941 and 63 pct in 1951.

Don't Charge It

But department stores have shifted markedly from charge-account to installment buying. About 18 pct of these sales were on time in 1951, against 8 pct in 1941. And charge-account sales fell from 44 pct of total to 29 pct in 1951.

Collection periods have been lengthened and downpayments shortened in the postwar period. Average length of department store contracts in 1946 was 9 months; in 1951, 13 months. Appliance contracts jumped from 6 to 14 months, furniture 8 to 13.



AUTOS: Float Where They're Going

Great Lakes car shipments start . . . Carriers hope to match record year . . . Some ships carry cars one way, return loaded with grain . . . Water shipments save money—By *R. D. Raddant.*

On Mar. 2, two heavily loaded ships moved away from Detroit docks and headed down the ice-rimmed Detroit river toward Cleveland. Both ships carried a maximum cargo of new cars fresh from the auto plants.

These shipments opened the season for this specialized and highly competitive form of Great Lakes commerce. Auto shipments don't rival ore, grain, coal or oil in economic importance, but they do fill an important niche in the industry.

Shipments Start Early

Like ore, auto shipments depend on the length of the season as well as production. The mild winter, which made early March shipments possible, was a boon to lines handling auto cars.

Since much of the business is earmarked for Lake Erie, auto plants don't have to wait for the opening of Lake Superior to ship cars to Buffalo and Cleveland, the principal automotive ports.

This year the two major auto carriers are hoping shipments will reach the 1950 level, which was the record year for auto production. The T. J. McCarthy Shipping Co. carries on an average of 150,000 cars a year, but slumped to 138,000 in 1952 because of the steel strike, a stevedore strike, and a poor automotive year generally.

This year the line hopes to carry 180,000 cars to Lake Erie ports and Duluth.

Had the Idea First

The larger Nicholson Transit Co. expects to carry nearly 340,000 cars to the same ports. This company has been shipping autos since 1928, and the idea of transporting autos on the Lakes is credited to William (Cap) Nicholson, colorful 89-year-old head of the company.

Nicholson Transit Co. has three ships reserved exclusively as auto carriers, and six others combine the job of carrying grain and autos. These combination grain-auto ships have elevators which are used to load the cars. With autos as cargo and deck load, the ships go to Duluth where they unload the cars and are reloaded with grain. Ships which carry only cars have to return to Detroit empty, so they are usually restricted to the Lake Erie trade.

The single-purpose auto carriers have three decks below the main deck, in addition to the main deck and flight deck. Each can be loaded with 100 cars, making the total capacity 500 autos.

Cars are loaded under their own power and reach the lower decks on ramps inside the ship. It takes about 4 hr for loading, and a ship can make the round trip to Cleveland in 24 hr, Buffalo in 48 hr.

Saves Money

Reason for the brisk auto shipping business is, of course, lower cost. It is estimated that freight differential between a water-shipped car and a highway-shipped vehicle is 25¢ for each 100 lb to Lake Erie, and 50¢ to Duluth.

This means the saving on shipment of a 3000-lb car to Lake Erie ports is $7.50, and $15 on Duluth deliveries.

There are some hazards involved in shipping cars by water, although not much damage is incurred enroute. Extra handling at both ends of the run causes most of the trouble.

Construction

Steel Inquiries and Awards

Fabricated steel awards this week include the following:

960 Tons, Springfield, Mo., plant Kraft Foods to Reynold Mfg. Co.

675 Tons, Peoria, Ill., YMCA Bldg. to Illinois Steel Bridge Co.

440 Tons, Cook County, Ill., Sect. 066-0303.5 to American Bridge Co.

160 Tons, Christian Co., Ill., bridge sect. 11B, to Mississippi Valley Structural Steel Co.

122 Tons, Cook County, Ill., Sect. 066-0202.1 to Wendnagle & Co.

Fabricated steel inquiries this week include the following:

1000 Tons, N. Chicago, Ill., warehouses Great Lakes Naval Station.

1000 Tons, Peru, Ind., Navy maintenance hangar.

900 Tons, Chicago, Federal Reserve Bank Bldg.

500 Tons, Rirle, Idaho, Powerhouse Bureau of Reclamation.

200 Tons, Madison, Wis., Hangar Traux Field.

Reinforcing bar awards this week include the following:

189 Tons, Bourne, Sandwich and Barnstable, Mass., bituminous concrete and 4 rigid frame bridges. Lewis R. Sellew, Middleboro, Mass., district engineer. Completion date is Dec. 31, 1953. Contract awarded to Campanella & Cardi Construction Co., Hillsgrove, R. I.

139 Tons, Tolland, Willington, Ashford and Union, Conn., grading, drainage and pavement extending to rolled beam bridge; 7 reinforced concrete box culverts on Rt. 15 (Wilbur Cross Highway). Low bidder is M. A. Gammino Construction Co., Providence, R. I.

STEEL: Presses Decontrol Fight

Industry pushing task force proposals . . . Decontrol case so strong government goes defensive . . . Plan's adoption would smooth shift from CMP . . . Expanded capacity assures supply.

The steel industry is continuing to press its case with the government for adoption of the task force "package" recommendations on decontrol. The task group's report to the director of NPA's Iron and Steel Div. recommended a six-point program on an all-or-nothing basis (THE IRON AGE, Feb. 26, p. 163). Thus far only one recommendation — open-ending of CMP—has been put into effect.

Task force members are preparing another report advising in detail how the remaining five points of the decontrol package can be carried out.

Present Strong Case

The industry feels its chances of having the task force recommendations accepted in total are good, although some resistance has been encountered.

Industry spokesmen say the case for decontrol is so strong that government bureaucrats are on the defensive for the first time since Korea. The industry's strongest arguments are (1) approximately 95 pct of steel for industrial expansion has been shipped, and (2) ingot supply this year will be approximately 118.8 million tons. Defense and AEC will require 14 million tons, leaving 105 million tons for other applications. This is 30 pct greater than the 81 million ingot tons that were available for non-defense, non-AEC in 1952.

Decontrol of steel is causing scarcely a ripple in the production and distribution pattern of the industry. No great amount of customer-supplier reshuffling is in prospect.

As the Controlled Materials Plan was originally set up, the lifting of controls would have been followed by a hectic period of near-chaos as the mills sought to re-establish old customer relationships.

But this was avoided by an amendment that permitted steel producers to choose their non-rated business up to 15 days before expiration of lead time on various products. Thus the mills were not only able to keep intact their long-established connections in the trade but the resulting business pattern was a more logical one.

Task Force Pushing

On rated business, the story was different since producers were required to accept such orders as received. But even here, the situation was not a total loss because some of these orders were from old customers anyway.

Bureaucrats Stall Decontrol

Early this week the government was still trying to find a way out of its predicament—how to let go of the tail of the CMP bear with respect to steel and aluminum allocation authority.

Control officials have issued the word that CMP and allocations will definitely be dropped when the current law expires on June 30.

Consumers have also been told by the agency not to submit applications for third quarter allocations—or for supplemental second quarter allotments unless they are for defense orders.

But they haven't been told how to get their third quarter orders placed with the mills which, in turn, don't know to what extent, if any, they are allowed to book orders on an unrestricted basis.

Both steel and aluminum industries have asked for a clear-cut statement of policy on advance allotments. They also have to know how to handle defense claims and other orders for third quarter production.

"Plans are being made to provide for whatever reduced controls will be necessary after June 30 to assure that defense needs are met," National Production Authority says. "They will be made public as soon as completed."

Meanwhile, proposals for standby control legislation are getting a rough going-over. Proposed legislation chiefly concerns price and wage controls, but some witnesses take time out for a slap at materials and production controls.

DECONTROL:

Fifth action ends lids on cars, trucks, parts, most appliances.

Recent removal of price controls from new and used cars and trucks, auto repair parts and most major household appliances permitted ceilings to remain on builders' hardware, certain chemicals, and a variety of items in the machinery field.

Principal consumer goods on which price limitations were still in effect after March 5 were waste disposal units, hot water heaters, some hardware items, home-heating oil, and a few beverages.

Decontrol 10 Pct of Index

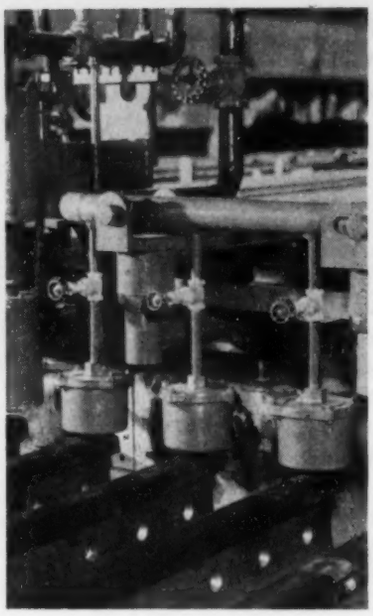
The decontrol action, fifth in a series issued by Office of Price Stabilization since early February, affected 10 pct of the weights assigned items in the Consumer Price Index. Price Stabilizer Joseph Freehill estimated the total annual sales of these goods as $25 billion worth.

According to OPS, prices "probably" will rise on auto parts and some appliances and services. Appliance manufacturers reportedly have indicated that higher costs of copper, decontrolled earlier, may necessitate similar boosts in the costs of finished products.

Franz Tells CF&I Story

In a meet-the-press conference in New York last week Colorado Fuel and Iron Corp. President A. F. Franz told how his company had changed from a western rail producer a few years ago to a far-flung organization with fingers in many products and market areas. Today almost half its operations are east of the Mississippi.

Much needed product diversification has been achieved by expansion and acquisition. Product range has been broadened from rail and fastener base to include a wide range of wire products (including special items, construction supplies, cold-rolled specialties, and seamless tubes.

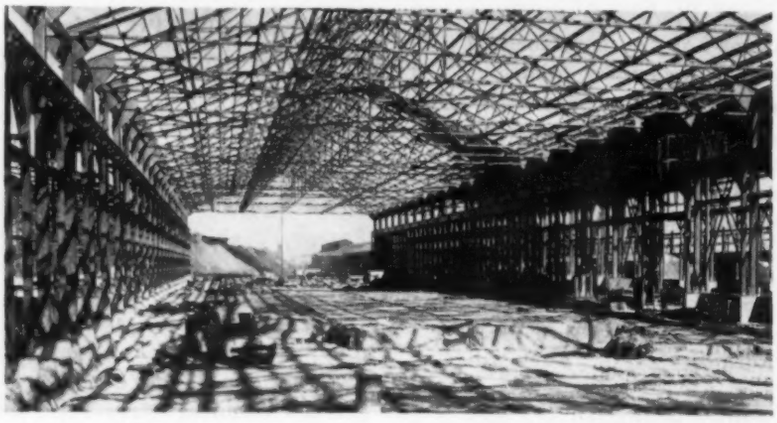


PRODUCT MIX has changed violently; in 1930 rails and fastenings were 70 pct of shipments; they now account for only 15 pct of CF&I business, even though the firm has increased its share of total market for these products. Rails above are being hardened to prevent end-batter.

Timetable of acquisition is as follows: Wickwire Spencer merged with CF&I, 1945; Worth Steel Co., Claymont, Del., acquired March 1951; E. & G. Brooks Iron Co., Birdsboro, Pa., and its subsidiary Richard Ore Co., Wharton, N. J., acquired January 1952; John A. Roebling's Sons Co., Trenton, N. J., acquired in January 1953.

Capacity operation through 1953 is forecast by Mr. Franz. Despite cutting operating costs to the bone (he claims lowest rail production costs in country), Mr. Franz warns that higher steel prices may be necessary because wages have gone up faster than prices.

Freight is an important factor in expansion of the firm, with Buffalo serving Detroit by water, new eastern plants serving that area and a new pipe mill in the heart of the oil country.



SEAMLESS TUBE MILL under construction in heart of area containing 75 pct of nation's oil and gas reserves . . . will have capacity of 150,000 to 200,000 tons per year . . . will cost $27 million.

Contracts Reported Last Week

Including description, quantity, dollar values, contractor and address. Italics indicate small business representatives.

Shell, HE 105 MM T-268, 2500, $112,825, Chamberlain Corp., Waterloo, Ia.

Indicator, tachometer, 639 ea, $88,022, General Electric Co., Philadelphia.

Wheel assy, var, $300,801, The B. F. Goodrich Co., Akron.

Actuators, 143 ea, $91,911, Lear, Inc., Grand Rapids.

Maintenance part for SNJ aircraft, var, $120,694, North American Aviation, Inc., Fresno, Calif.

Miniature practice bombs, 675000, $391,937, Agricola Furnace Co., Gadsden, Ala.

Drive motor, 774 ea, $155,574, General Electric Co., Chicago.

Machine, link loading, 20000 ea, $154,860, Marnat Eng. & Mach. Wks., San Francisco.

Wrench, combination, 70000 ea, $80,990, East Moline Metal Products Co., Moline, E. Ill.

Cylinder, gas, 3540, $108,465, Randolph Lab., Inc., Chicago.

Divider assy, 5 ea, $55,917, Century Mach. Co., Cincinnati.

Metal parts for booster, 16300 units, $1,548,500, Grand Rapids Hardware Co., Grand Rapids.

Fuze, PD, 1000000, $1,963,320, Stewart Warner Corp., Chicago, *E. N. Osterberg.*

Automotive spare parts, $222,803, International Harvester Co., Chicago.

Fin, shell, 500000, $295,000, Madison-Kipp Corp., Madison, Wis.

Cart, ball, cal. .30, 21000000, $1,914,570, Remington Arms Co., Bridgeport, Conn.

Bomb, 113600, $2,708,224, Allen Mfg. Co., Nashville, Tenn.

Body grenade, rifle, 800000, $191,200, Shearer Electric Mfg. Co., Little Rock, Ark.

Fuze, rocket, dummy, 7500, $557,250, Harvey Machine Co., Torrance, Calif.

Brass cartridge case discs, 64000000, $1,411,720, American Brass Co., Waterbury, Conn.

Fuze, grenade, hand, 48401, $122,750, Bayshore Industries, Elkton, Md.

Repair parts, F/crane-shovel, 779 items, $150,542, Baldwin-Lima-Hamilton Corp., Lima, Ohio, *P. R. Ehrgott.*

Repair parts F/rock crushers, 654 items, $159,828, Pioneer Engr. Works, Minneapolis.

Repair parts F/crawler, cranes, 128 items, $221,252, Northwest Engr. Co., Chicago.

Repair parts F/crane shovel, 684 items, $765,118, Marion Power Shovel, Marion, Ohio.

Valves, 902 ea, $162,832, Ludlow Valve Co., Troy, N. Y.

Valves, 112 ea, $32,623, Industrial Pipe & Supply Co., Cicero, Ill.

Valve, thermostat control, 1089 ea, $114,345, Leonard Valve Co., Cranston, R. I.

Plants, refrigerating, 4 ea, $55,946, Carrier Corp., New York.

Adapter, grenade, 601095, $1,004,000, Wald Industries, Inc., Huntingdon, Pa.

Repair parts for electric motors and generators, 85713, $363,901, General Electric Co., Philadelphia.

Repair parts for steam traps, 20864, $70,630, The Sharpless Corp., Philadelphia.

Lathe, 12 ea, $629,611, Robert R. Stephens Machinery Co., St. Louis.

Reishauer tooth flank gear grinding machine, 6, $254,754, Cosa Corp., New York.

Boring machines, 14, $209,480, The Heald Co., Worcester, Mass.

Cutting outfits oxyacetylene, 510, $91,208, Welder's Serve Co., Pittsburgh.

Spare parts for P2V aircraft, var, $230,207, Lockheed Aircraft, Burbank, Calif., *J. S. Card.*

Pump assys for var aircraft, var, $161,861, Lear, Inc., Elyria, Ohio.

Maintenance parts, var, $53,300, Douglas Aircraft Co., El Segundo, Calif., *W. H. Hough.*

Generator, tachometer, 1859 ea, $77,552, Jack & Heintz, Inc., Cleveland.

Fan assy, 144 ea, $288,382, The Benson Mfg. Co., Kansas City, Mo.

Spare parts, var, $43,631, Briggs Stratton Corp., Milwaukee.

Spare parts, var, $83,020, Barber-Greene Co., Aurora, Ill.

Loader, scoop type, 26 ea, $327,241, International Harvester Co., Melrose Park, Ill.

Industrial Briefs

Southern Expansion . . . LEHIGH WAREHOUSE & TRANSPORTATION CO., Newark, N. J., is expanding its southern operations and has opened a warehousing and distribution center in Atlanta.

New Moniker . . . THOR POWER TOOL CO., Aurora, Ill., is the new corporate name of Independent Pneumatic Tool Co.

New Office . . . OLIVER IRON & STEEL CORP., now has a general sales office in the Oliver Bldg., Pittsburgh.

Construction Underway . . . INGALLS SHIPBUILDING CORP., Birmingham, has begun construction of its fifth Mariner-type cargo vessel for the Maritime Commission. The vessel, the *Peninsula Mariner*, named for the state of Florida, will be 590 ft long and will cost approximately $8 million.

Gets Contract . . . RUST ENGINEERING CO., Birmingham, has been awarded a $2.7 million contract for construction of a new tallow oil refining and processing plant for Newport Industries of Pensacola, Fla.

Change . . . The Texas Mining & Smelting Div., NATIONAL LEAD CO., will be operated as a part of the company's Metal Dept.

Research Center . . . U. S. STEEL CORP., Pittsburgh, will construct an entirely new research center for developing new and better steels and steel technology. The center will be located in a rural area of Allegheny County near Pittsburgh.

Storage Room . . . SCAIFE CO., has added two sizes of new ASME tanks to its line of FuelPack stationary tanks to meet the increasing need for larger above-ground LP-gas storage.

Change Made . . . MIDWEST PIPING CO., INC., is the new name of Midwest Piping & Supply Co., Inc.

At Your Service . . . VIRGINIA METAL PRODUCTS CORP., has just opened a new Cincinnati district office at 1013 Provident Bank Bldg., Seventh & Vine Streets. Donald R. Moffat is manager.

Big Furnace . . . ASHMORE, BENSON, PEASE & CO., Stockton-on-Tees, England, will build what is claimed to be Britain's largest blast furnace for the Steel Co. of Wales.

New Plant . . . BLISS & LAUGHLIN, INC., Harvey, Ill., will open a 40,000-sq ft cold-finished bar plant at Detroit next month.

New Agent . . . LATROBE STEEL CO., Latrobe, Pa., has appointed Eight, Inc., Metals Sales Div., Salt Lake City, Utah, as its exclusive sales agent in Utah, Idaho and Eastern Nevada.

On Campus . . . Indiana Chapters of the AMERICAN SOCIETY OF TOOL ENGINEERS, Detroit, will sponsor a panel discussion on "Hard-to-Machine Materials," reports of special research on grinding of geometric sections and a tour of the new million dollar machine tool laboratory of Purdue University at Lafayette, Ind., April 18 as features of the Tool Engineering Conference to be held on campus.

Canadian Facilities . . . ELOX CORP., of Michigan, has expanded company manufacturing and sales facilities by establishing Elox of Canada, Ltd., at Montreal.

Ready to Roll . . . McDANEL REFRACTORY PORCELAIN CO., has completed a 4000-sq ft addition to its Beaver Falls, Pa., plant to house a modern research laboratory.

Sales High . . . NATIONAL MALLEABLE & STEEL CASTINGS CO., Cleveland, reports that its net sales for 1952 were $54,304,000.

Planning . . . Radio Tube Div., SYLVANIA ELECTRIC PRODUCTS, INC., plans to construct a 120,000 sq. ft facility in Williamsport, Pa., which will house a group of divisional engineering laboratories.

New Headquarters . . . GUNNISON HOMES, INC., U. S. Steel's housing subsidiary, is establishing seven district offices in major marketing areas. The offices will be in Chicago, Atlanta, Columbus, O., Newark, N. J., Omaha, Neb., Dallas, and a Louisville district office with headquarters at the company's plant in adjacent New Albany, Ind.

Extras Highlight '53 Advances

Special units major features of car development in this year's models . . . Fram Corp. president details changes . . . Special features become standard—By *R. D. Raddant.*

Engineers who worked on basic factors of design and construction apparently played second fiddle in the auto industry in development of 1953 models.

It's not that there wasn't progress in nearly every branch of automotive engineering. But it appears that the boys who worked on special units, "extras" they are usually called, made the greatest progress on new passenger cars.

This is the conclusion of W. S. James of the Fram Corp., Providence, from a detailed study of engineering development of 1953 models. It was presented last week in Detroit before the Society of Automotive Engineers National Passenger Car, Body, and Materials Meeting.

Variety Most Significant . . . "The most significant highlight of the 1953 cars is the tremendous number and variety of special equipment, or accessory items, and even special sports cars, that are available to purchasers. It will probably be very difficult to purchase a plain, ordinary car," he predicted.

He pointed out that in some cases the cost of special equipment items can amount to over 25 pct of the cost of the basic car. These new developments include air conditioning, power brakes, power steering, automatic headlight dimmers, tinted glass, signal seeking radio, automatic transmissions and hardtop bodies.

Not All New . . . Obviously, not all of these units were shown for the first time in 1953 models. Mr. James referred not only to introduction of new units, but the extension of use of units that a short time ago were in the experimental stage and now approach universal use on all makes and models.

He contends that these special items do have a tangible benefit. They provide the means for accelerating development and reducing production costs until they can be used on lower priced cars.

He cites power steering as a good example. It has been in use only slightly over one year, but is already being manufactured by four parts companies with varied principles being employed. He believes that refinements and simplifications will be made until power steering will be standard on most cars at a low cost.

Similar development in a more advanced stage is underway on automatic transmissions. Turn signals complete the cycle.

Automotive Production

(U. S. and Canada Combined)

WEEK ENDING	CARS	TRUCKS	TOTAL
Mar. 7, 1953	130,456*	30,210*	160,666*
Feb. 28, 1953	136,901	30,878	167,779
Mar. 1, 1952	88,166	26,960	115,126
Feb. 23, 1952	90,777	27,620	118,397

*Estimated

Source: *Ward's Reports*

Getting specific after these general conclusions, Mr. Fram reported on his statistical examination of 1953 cars as compared with 1952 models.

These are a few of the trends he observed:

There is a slight trend toward longer cars. Statistics show that there are twice as many cars in 1953 in the 210 to 220 in. length group as in 1952. This is a longer than average length. Cars are considerably lower, but slightly narrower. At the same time when overall length was being stretched, wheelbases remained almost the same as last year's models.

Give More Power . . . Most significant engine change was increased compression ratio. This amounted to about 0.2 increase across the industry with a decided increase in maximum compression ratio.

This year's engines develop a greater thrust at maximum torque. This means that acceleration of cars is increased at higher speeds.

Contention is that the more powerful engines are not intended for increased speed, but for increased acceleration in driving range. It's smart to have pickup.

Shift Over . . . Biggest change in carburetors is the decrease in the single barrel and increase in the four barrel carburetor. There is a tendency to increased use of the oil bath air cleaner. The reverse flow muffler gained over the straight through muffler. And the 12 volt electrical system entered the picture this year.

All in all, Mr. Fram's studies took in more than 150 features with each of his conclusions supported by statistical analysis based on the Automobile Manufacturers Assn. consolidated specification questionnaire. These ranged from overall length to spark plug gap, obviously too many features to be listed individually.

Ford Sets New Five-Year Plan

Ford Motor Co., which has already poured $900 million into postwar expansion, has announced a 5-year plan for an additional $500 million building program.

Ernest R. Breech, executive vice-president, pointed to the program as another step in Ford's drive for "greater output per hour and higher quality with lessened costs . . . to produce more and better goods at prices more and more people can afford to pay."

The expansion was touched on in a Miami address by Mr. Breech in which he expanded on the open door tariff policy recently advocated by Henry Ford II. To industry, however, Ford's policy of continued expansion no doubt had the bigger impact. Ford's car production rather than economic theories still is the prime interest to realistic competitors in the auto industry.

In the postwar period under young Mr. Ford, the company's expansion and decentralization from the Rouge has been one of the biggest single factors affecting the auto industry. This program has seen the biggest strides in automation and improved manufacturing methods as well as physical expansion.

Some critics are beginning to point to a white elephant here and there, even among Ford's newest and highly publicized plants. How much of this is sound criticism and how much professional jealousy only time will tell.

Most New Cars Replacement Units

Skeptics who wonder who is going to buy those 6 million passenger cars the auto industry intends to turn out in 1953 might look to auto scrapping statistics.

According to statisticians R. L. Polk & Co., production of new motor vehicles in 1952 just barely kept ahead of scrappage of old cars and trucks. For every four new units purchased by motorists in 1952, three went into the junk yards.

In plain figures, new registrations totalled 4,158,394 for the year against 3,138,989 scrapped. This is a percentage of 75.49 pct.

FORD'S XL-500 is the latest in the flow of experimental models from Detroit's labs and model shops. Major features are a scarlet Fiberglas body and all-glass roof.

Warns on Salt Corrosion Damage

Salt corrosion has become a problem to both automakers and owners, particularly where salt is applied extensively to de-ice streets in metropolitan areas.

Many a motorist has wondered whether he might prefer risks of skidding when confronted with peeling brightwork after the end of the winter season. However, salt effects might not be as bad as they seem at first glance.

In an SAE paper, F. L. LaQue of the International Nickel Co. points out that excessive salt may not be as corrosive as a lighter application. Lesser corrosion from more concentrated salt solution, as indicated in tests, can be accounted for by lower solubility of oxygen in stronger solutions.

He pointed to studies that indicate that the "most important mechanism" by which salt treatment may aggravate corrosion of automobiles is by interfering with the formation of protective rust films. These can occur from plain water to result in a protective film. Brine sprays result in corrosion that offers little barrier to progressive attack.

His recommendations: Wash the car frequently before primary or secondary corrosion effects can set in. Keep the car in a dry place so that humidity will not be high.

THE BULL OF THE WOODS — **By J. R. Williams**

Plan to Build Up Business Aid Bureau

Secretary of Commerce Weeks will enlarge functions of Office of Distribution to plan against recession . . . What questions will be considered . . . Need OPS employees?—By G. H. Baker.

Washington's interest in "destiny of business" subjects keeps growing. Under the direction of Secretary of Commerce Sinclair Weeks, an intensified program of government assistance to industry's sales force brass is beginning to take shape. The machinery to do this was set up by former Commerce Secretary Sawyer and will be expanded.

Plan Now . . . Secretary Weeks and President Eisenhower's economic aides firmly believe anti-recession measures must be planned now. This is not an alarmist gesture but is said to be a commonsense program to prevent any dangerous economic situation before it happens. It is intended to forestall the need for hurry-up action by the government after the horse is stolen.

Among the questions to be considered are the effect of heavy boosts in manufacturing capacity on sales. Will population hikes and growing demand be enough to absorb increasing output of goods and services? If there is to be some surplus production what economic stimuli will be needed to balance the scales?

Spadework in connection with rebuilding the Commerce Dept. role in business planning has already been undertaken by Mr. Weeks.

Framework of this new business assistance structure is now being put in place.

Keep Business Healthy . . . Top priority has been assigned by Mr. Weeks to a substantial expansion of the 5-month-old Office of Distribution within the Commerce Dept. This office was set up by former Secretary of Commerce Charles Sawyer last October to promote a more efficient and effective distribution of goods and services with the goal of assuring continued high levels of production and employment.

Key management officials in a number of manufacturing and distributing industries are working daily with Mr. Weeks in building the new aid-to-business bureau. H. B. McCoy, Assistant Secretary of Commerce, who heads the new Office of Distribution on a temporary basis, is being urged by many industry representatives to take the assignment on a permanent basis.

New Spec Index Ready

Harassed purchasing agents can take heart. The government has published the long-awaited "Cross-Index of Chemically Equivalent Specifications & Identification Code" for ferrous and non-ferrous alloys.

The index identifies alloys with similar chemical composition by a single code number and provides a reference whereby composition of different metals specs can be compared.

New edition is a joint effort by the three armed services and General Motors Corp. personnel. Designated DSMA Handbook 1, it will be revised annually in the future. Last revision was in 1945.

Copies may be ordered now from the Superintendent of Documents, Washington 25, D.C. at $1 per copy. Orders will be filled starting about Mar. 20. It will also be available through contracting officers throughout the country.

Provides Statistics . . . An important byproduct of the office's principal output—advice—will be the availability under one roof of statistical and economic information. Business men for years have complained rightfully about Washington's scattered sources of industrial information. To collect complete information a business man often must run from the Census Bureau to the Federal Trade Commission to the Social Security Administration to the Bureau of Internal Revenue. In the past, neither the White House nor the Congress could agree on a central distributing point.

Under present plans, business men will soon be able to obtain any available economic data from a central source—the Office of Distribution.

Need Employees . . . Expiring Office of Price Stabilization is striving to take care of its own. A letter from P. L. Charles, OPS director of personnel, ends with this sentence: "The end of OPS can mean a real opportunity for business to obtain proven talent."

He explains that OPS must discharge its remaining employees before Apr. 30, extols their virtues as experienced economists, lawyers, accountants, etc., and suggests to industry that room be made for them.

How to Interview . . . Arrangements to interview personnel of regional and district offices may be made directly with those offices. To interview workers at the Washington office, call the Personnel Div. in Temporary E Building, 4th and Adams Dr., S.W., Washington 25, D. C.

From OPS come discreet murmurs that there will be no red tape on this operation.

OPS explains that a great number of its employees have been recruited from industry. Attorneys, for instance, also came from law schools, private practice.

OIL: Do We Need More Refineries?

Government wants to play it safe in event of war . . . But industry is already topping earlier goals . . . Question need for more high-octane capacity—By *A. K. Rannells.*

Despite urging by the National Security Council for a continued increase in what it calls "petroleum preparedness," expansion of oil refining capacity has slowed to a walk and looks like it might stay that way for awhile, the agency is now claiming.

The government, trying to play it 100 pct safe, wants refining capacity at a level that would assure ample supplies even in the event of a full-scale shooting war. But industry feels the traditional 10 pct excess capacity is sufficient—particularly in view of high capital expenditures needed for expansion and a possible shift in demand patterns in the foreseeable future.

Reasons are varied and complex. Overriding fact is that the expansion goal of 1,000,000 bbl daily in new capacity (above 1950 operating levels) will have been attained by end of 1953.

Overshoot the Target

This means that the nation's refining capacity by next January will be approximately 8,000,000 bbl daily. This more than provides the 10 pct share capacity which is the historical ratio.

But this is not enough from the government viewpoint. Citing World War II as an example, the government says that in time of full mobilization or war, the inevitable bottlenecks would more than wipe out the excess operable capacity in a very short time.

This refinery expansion has cost the industry something close to $1 billion over the 3-yr period, not counting expenditures for high octane aviation gas capacity or for chemical products. It has been accomplished mostly without any government financing or other aid except approval of certificates for fast tax amortization.

Meanwhile, both taxes and costs have increased without corresponding boosts in product prices. Unless the public is willing to pay more for its gasoline or the government reduces taxes, industry feels it can't afford to build up more than the traditional 10 pct of excess capacity.

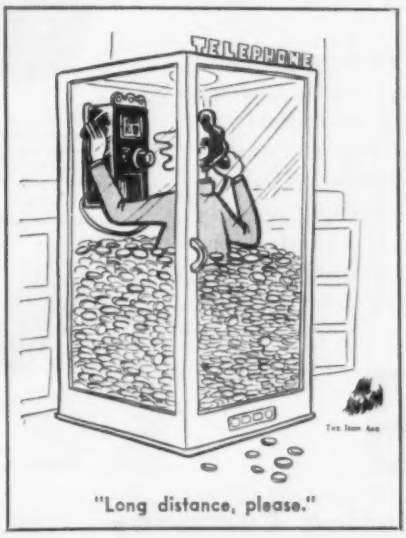
Jets Burn Kerosene

Another problem is the outlook for consumption of aviation-type gas. Taking a quick look at he trend toward jet power, industry is inclined to move cautiously with any expansion in this rather uncertain field.

Most jet fuel is kerosene-like in character, both easy and cheap to produce. Industry doesn't want to be caught with a lot of excess capacity for producing high-octane aviation grade fuel that may not be needed for war.

The government scoffs at any idea of decreasing demand for aviation grades over the foreseeable future, especially grades above 100/130. Jet power is still confined largely to military use.

"Demand for aviation grade gasoline for U. S. military aircraft will continue upward for several years before leveling off, as jet power replaces piston engine aircraft," the Petroleum Administration for Defense says flatly.



"Long distance, please."

See Vast Growth

On the basis of PAD surveys, domestic civilian consumption of grades above 100/130 amounted to 2,300,000 bbl in 1952. The agency predicts it will triple to more than 7,000,000 bbl by 1955. It foresees another 40 pct increase in demand to about 12,000,000 bbl by 1962.

Insofar as grade 100/130 itself is concerned, PAD sees demand increasing from 15,000,000 bbl in 1952 to more than 18,000,000 bbl by 1955 and close to 20,000,000 bbl by 1962.

Washington sources say industry is not likely to embark upon any long-range expansion program in this field. That is, unless the government wants to partially finance the project or give some sort of guarantee of a market.

Set Mexican Manganese Ore Price

Price to the government of 230,500 tons of Mexican-mined manganese ore, to be bought under contracts announced last week, will be $19.30 per long ton for 25 pct ore, f.o.b. freight cars at the depot set up in El Paso, Tex.

Defense Materials Procurement Agency signed the contracts with Winter, Wolff & Co., New York; Frank Samuel & Co., Philadelphia; Continental Ore Co., New York; and Industrial Development Corp. De Mexico, S. A., of San Luis Potosi. In an earlier agreement, the agency arranged to buy 50,000 tons from manganese producers at the El Paso, Depot.

Between 30 and 40 small Mexican mines will supply the ore called for in the four new contracts. Mines as distant as 1000 miles south of the border are involved.

DMPA is negotiating contracts which are expected to add 269,500 tons of manganese to the total now on order. Entire amount, 550,000 tons, is scheduled for delivery at El Paso within 3 years.

NOW 75-TON MULTIPRESS®

MODEL QA75

Big-job Multipress added to line

NOW — *all production-boosting Multipress advantages can be applied to jobs calling for pressures up through the 75-ton range!*

MANUAL OR AUTOMATIC CONTROL: A choice of nine control valves offers manual or automatic operation to suit any need. Dual-push button or hand-lever controls available for extra safety. Hold down and other operating sequences are easily provided.

VERSATILE RAM ACTION: The 15-inch maximum ram stroke of the new 75-ton Multipress is fully adjustable for both upper and lower limits. Pressing and approach speeds are *independently* adjustable. Continuous cycling of automatically controlled ram may be set for either distance or pressure limits.

TOUCH CONTROL: With the New Multipress servo control added, the ram starts, stops, reverses, speeds up, slows down, or applies pressure *in direct relation to every action on the hand lever.*

INDEX TABLE FEEDS AND OTHER ACCESSORIES: Six- and 12-station Multipress Index Tables can be used for fast, automatic, multiple-point feeding or assembly of parts. Many other automatic feeds, auxiliary attachments and work-speeding accessories also available.

The 75-ton Multipress has a 30-inch daylight opening (gap) . . . 34-inch work table width . . . 13-inch throat depth. Height, only 106 inches. *Write* today for full details on this versatile, big-job Multipress. *Other sizes and capacities from one to 50 tons.*

After switching to Multipress, only three draws were needed to form heavy phosphor-bronze housings that required six operations by the former method.

With each ram stroke, Multipress puts 120 close-tolerance notches around a thin-walled compass bezel. Averaging 800 per hour, rejects dropped to .0025%.

With quick, accurate "one-shot" assembly of this 6-part metal and plastic switch component, Multipress boosted output 80% and cut scrap loss 84%.

Multipress increased production speed to 3½ times the previous rate, in staking metal pins in a precision part of a famous-make 3-speed record changer.

DENISON Hydr OIL ics

The DENISON Engineering Company 1158 Dublin Road, Columbus 16, Ohio

Balmy Weather Warms Scrap Stocks

Early spring gets collectors out ahead of schedule . . . High dealer stocks put mills in driver's seat . . . Plan revival of No. 3 bundles . . . Water shortage growing—*By T. M. Rohan.*

The weatherman is smiling on the West Coast early this year, getting a return smile from some quarters but only a worried look from others.

Principal effect on the steel industry was the scrap pile-up from collectors lured out by the sunny weather throughout California. At week's end, there had been no measurable precipitation since Jan. 21, longest dry spell in 104 years. Incoming scrap at dealer yards put mills in the driver's seat firmer than ever.

Revive No. 3 . . . One major mill plans revival of No. 3 bundles although opposed by an independent mill. Dealers will have an opportunity to unload galvanized scrap before the new classification takes effect, probably at about $4 under No. 2 bundles.

Major reason besides price is cutting down zinc input to openhearths to reduce characteristic heavy black smoke in smog-conscious Los Angeles area.

With one major exception, mills are buying at least half their melt and some have resumed buying after a lapse. Dealers feel present early inflow of scrap may cause minor shortages later in the year, assuming full capacity operation, but they concede chances of a price rise are slim.

Water Running Out . . . Water reserves in California, despite the drought, were normal at the beginning of the week, but are now dropping off. Unlike the Pacific Northwest, which is about 90 pct hydro power, Pacific Gas & Electric Co. with a 50-50 steam-hydro split has no worries.

In Washington, the basic logging and fishing industries were picking up. Foundry and machine shop work is on the upswing and requests for bids have increased. A prolonged ship strike has stopped movement of construction materials to Alaska, which will seriously hamper the short season there. Restless workers are starting northward early against union advice, complicating matters.

Probe Oregon Alumina . . . Harvey Machine Co. of Torrance, Calif., last week had just about completed arrangements for purchase of the wartime Salem, Ore., alumina clay research plant. Plant was one of four put up to explore use of regional ores for aluminum.

Harvey was high bidder at $300,000, but the government held up sale and final settlement will probably be at a somewhat higher price. Some pressure for the sale was exerted in Washington, D. C., by local Salem interests.

Where To Put It? . . . Harvey's $20-million aluminum rolling mill may still be put up in Oregon near The Dalles reduction plant. A company spokesman said last week that it would undoubtedly be economically sounder to locate the mill near the major Los Angeles market. But it might be put near the reduction mill due to heavy Pacific Northwest pressure for aluminum fabrication to employ more workers in relation to power consumed.

"Some of this decentralization program is ridiculous."

Harvey still has a 5 pct interest in the Columbia Falls, Mont., Anaconda Aluminum Co. plant and will get 25 pct of the planned 54,000 annual net ton production.

Watch It . . . The western steel market, expanding about twice as fast as the rest of the nation's, bears close watching by market analysts. And one of the leaders, Bay Estes, U. S. Steel's market research director in San Francisco, last week said lessons are being learned there. Mr. Estes said western steel production and finishing capacity are now about level, so any expansion must be preceded by basic production increase. He concurred with most other observers that supply and demand will level off about midyear but added the West will not be the first area for this.

Setbacks Coming . . . In a prepared talk before the Northern California Chapter of the American Marketing Assn., he warned of approaching "serious setbacks" and said most market analysts have been guilty of habitually projecting growths in late years.

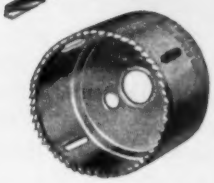
Government economies will seriously hit statistics gathering operations and resistance to them is growing already because of the fear statistics will ultimately be used for control, as by NRA.

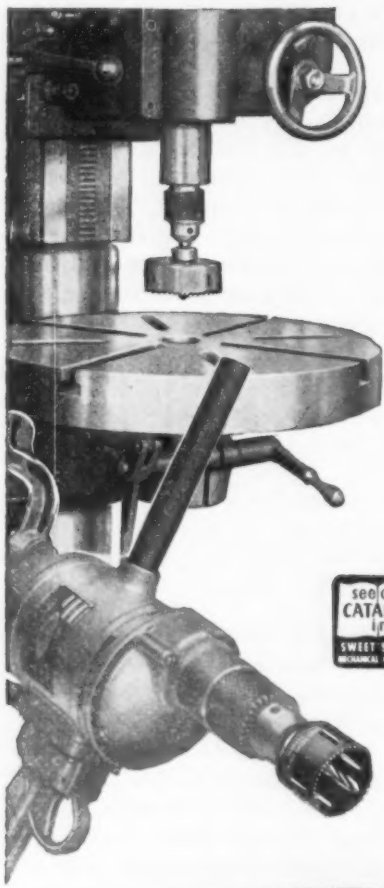
Mr. Estes said tougher selling days should see the market research man rise from fact gathering to the policymaking level. New fields are opening in purchasing research, he added, since a dollar saved there is more profitable than an extra sales dollar.

Cut...

LARGE HOLES

. . . thru any machinable material up to 1⅛ *INCHES* thick!





Here is a premium tool which makes it possible to saw holes in one short operation . . . large holes which heretofore had to be laboriously machined "a-chip-at-a-time."

MARVEL High-Speed-Edge Hole Saws have strength to withstand the terrific peripheral strains of heavy duty operation in lathes, drill presses or portable power tools. They have a high speed steel cutting edge which is electrically welded to a tough, alloy steel body, high speed steel pilot drills, heavy hexagonal shanked arbors and sufficient set for deep drilling. They are self-aligning, as the larger diameter saws float on their arbors and are driven by double drive pins. They will saw round holes accurately in any machinable material.

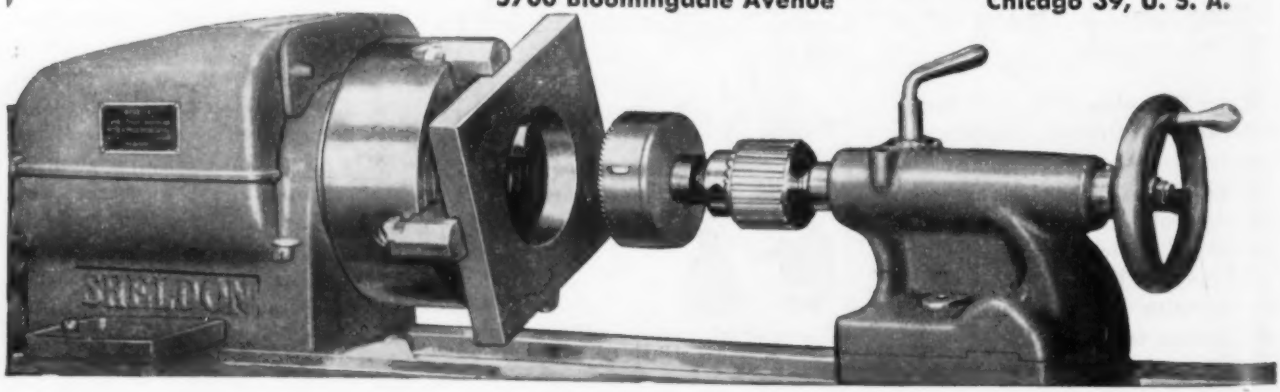
MARVEL High Speed-Edge Hole Saws come in 35 sizes, from ⅝" to 4½". They are carried in stock by leading industrial distributors.

WRITE FOR BULLETIN ST-650

"MARVEL" *has Always had the edge!*

MARVEL *Metal Cutting* **SAWS**
Better Machines - Better Blades

ARMSTRONG-BLUM MFG. CO.
"The Hack Saw People"
5700 Bloomingdale Avenue **Chicago 39, U. S. A.**



Foreign Tools Drop "American Look"

Decrease in U. S. demand for foreign tools is forcing European builders to abandon efforts to copy American tools . . . Will revert to pre-Korea variety, simplicity—By E. C. Beaudet.

With defense orders for machine tools declining and controls being relaxed as the industry returns to normalcy, machine tool imports are also reverting to a prewar pattern.

Imports of foreign tools reached a record high during 1952, however, increased availability of American tools is expected to reduce purchases of foreign tools during 1953.

Korea Opened Market . . . The flood of defense orders following Korea provided European builders with an excellent chance to increase their sales in the booming American machine tool market.

To serve American needs, European builders increased the horsepower of their machines and adopted electronic controls and copying attachments. There was also a trend toward greater rigidity, higher spindle speeds and use of antifriction bearings, as Europeans tried to meet the needs of the American market.

Criticize Change . . . These innovations are now being criticized by some segments of the European machine tool industry. It is claimed that attempts to copy U. S. tools have forced heavy capital investments and reduced the variety of models produced. With U. S. demand declining, there is no longer so great a need for building American-type tools.

What They Offered . . . One leading German machine tool builder summarizes the situation as follows: In normal times customers bought German machine tools because of their low price, light weight, reduced power consumption and lower operating cost. Simplicity of design and greater variety were other important advantages of imported tools.

Foreign sales concepts were altered because of changes in the American market following Korea. Many German, Italian and French builders cut down on the variety of tools produced and increased horsepower on remaining models.

By patterning production after American methods their costs have gone up. To build equipment according to American standards at a profit requires a high sales volume, which foreign builders no longer have as American demand has faded.

Don't Want Imitations . . . With American machine tools becoming more available, German builders report customers from other countries are reluctant to place orders for European-made, American-type machine tools.

The Germans say these customers prefer to get U. S. machine tools from America and want special or supplementary tools not produced in the U. S. from European builders. They are accustomed to buying American standard machines "as is" and expect European producers to take care of their special needs.

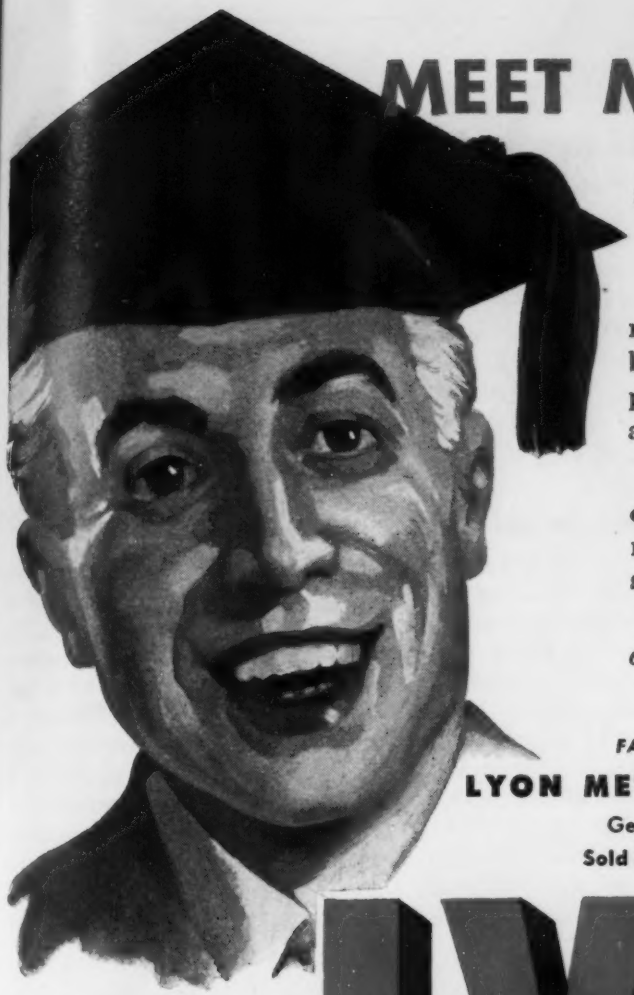
Demand Drops . . . With demand from U. S. manufacturers receding sharply, it is not profitable for European builders to continue production of American-design tools, these tool men believe.

An indication of decreased U. S. demand is the recent drop in German exports. Near the end of 1952 German exports were about 27 pct below the same period in 1951. New orders for the period were about 30 pct under the 1951 rate. Backlogs dropped from 9 to 5 months at the same time.

Revert to Variety . . . As a result, German builders are reported reverting to the variety and versatility of the prewar years and are abandoning production of American-type machine tools.

This trend is further backed up by reports of American importers. While not ready to admit that there is a serious drop in demand for foreign tools, they do acknowledge that sales are slowing for machine tools which are counterparts of American models now becoming more readily available.

They believe, however, that there will continue to be a good market in America for special machine tools not made here. Among those expected to remain in good demand throughout the year are: High-precision jig borers, twist drill grinders, automatic spinning lathes and pattern makers' milling machines—all hard to find here.



MEET MR. LYON, D.D.S.*

*Dealer of Diversified Services

LYON's national organization of steel equipment dealers serves virtually every segment of business and industry—with a diversified line of products totalling more than 1500 different standard items. (A very few are shown below.)

Factories, shops, warehouses, offices, churches, clubs, hospitals, homes—these are just a few of the many markets Lyon dealers serve with quality steel products.

Engineering and production facilities are also available for special contract work.

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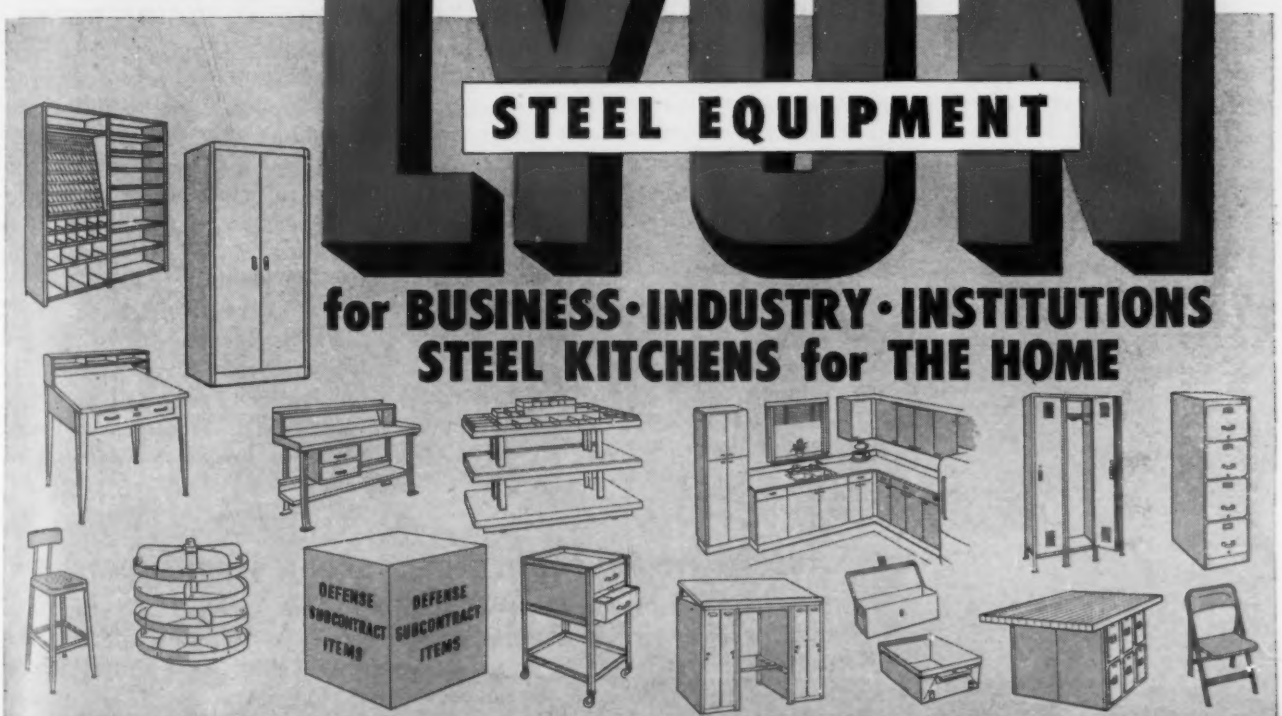
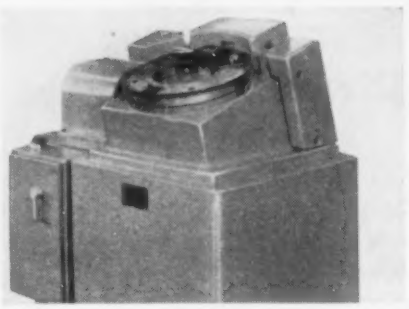


A PARTIAL LIST OF LYON STANDARD PRODUCTS

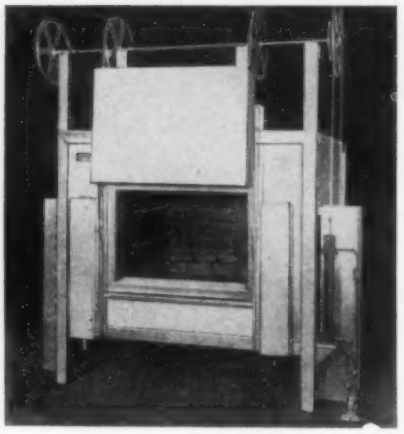
- Shelving
- Lockers
- Stools
- Bin Units
- Kitchen Cabinets
- Cabinet Benches
- Storage Cabinets
- Drawing Tables
- Tool Taters
- Bar Racks
- Tool Boxes
- Parts Cases
- Economy Locker Racks
- New Freedom Kitchens
- Toolroom Equipment
- Wood Working Benches
- Display Equipment
- Flat Drawer Files
- Revolving Bins
- Hanging Cabinets
- Filing Cabinets
- Folding Chairs
- Work Benches
- Bench Drawers
- Service Carts
- Sorting Files
- Drawer Units
- Hopper Bins
- Tool Stands
- Shop Boxes
- Tool Trays
- Shop Desks



Chamfers 20 flywheel ring gear teeth a second

High speed Burr-Master deburrs and chamfers all the teeth of a 14-in. diam, 156-tooth flywheel ring gear in 8 sec cutting time. The gear is loaded into the machine by slipping it over three rolls on the fixture, and into mesh with a drive gear. A locating finger, moving with the cutting tools, automatically locates the gear teeth radially on each stroke of the form-type cutting tools. With the drive gear indexing continuously, chamfering begins as soon as the gear to be cut is meshed with it. Depth of cut is readily adjustable. *Modern Industrial Engineering Co.*

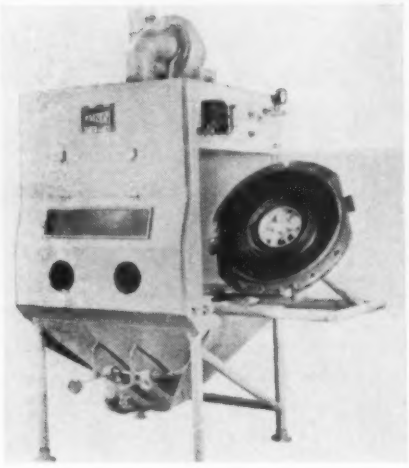
For more data circle No. 23 on postcard, p. 101.



Electric furnace suited for porcelain enameling

A new Globar type electric furnace suited for porcelain enameling and other heat treating operations features a 36 in. wide x 48 in. deep x 24 in. high chamber to make it practical for handling either large, heavy items or production quantities of smaller products. It operates at a temperature of 2400°F with a work load of 350 lb of metal per hr. Is heated by Globar elements set on each side of the chambers, from front to back and is sufficiently powered to give rapid recovery time after door is opened or closed during change of loads. The door is counterbalanced, atmosphere-tight and operable by a foot-controlled air cylinder. Hearth is solid SiC tile or triangular rails. It is powered by 60 kw, 440 v, 60 cycle, 3 phase. The all-welded unit has an overall size of 77 in. wide, 71 in. deep and 80 in. high. *Pereny Equipment Co.*

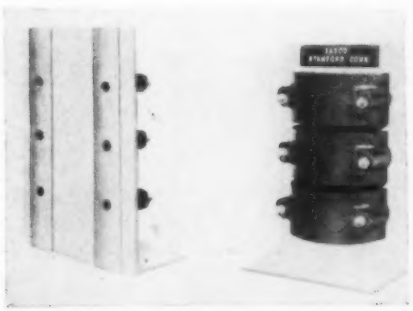
For more data circle No. 24 on postcard, p. 101.



Jet blast machine requires minimum maintenance

Elimination of moving parts in contact with abrasive reduces maintenance on a new liquid abrasive blasting machine, to a minimum. The machine is designed to clean, finish, burr, blend or etch a wide variety of dies, molds, tools and other parts; is engineered for around-the-clock use. The liquid slurry is drawn up by siphon injection and propelled from the blasting nozzle by means of a high velocity air stream. Only moving part within the cabinet is the blower which is used to ventilate the cabinet. Abrasives used range from 60 to 5000 standard screen size. A reversible pump beneath the cabinet effects fast changeover of slurry—in less than 5 min. Method of maintaining the slurry in suspension permits higher concentration of abrasive at point of work, increasing speed of operation. Metal removal can be held to 0.0001 in. Machine can be equipped with turntable to speed handling of pieces; can have up to eight fixed spray guns. *R. W. Renton & Co.*

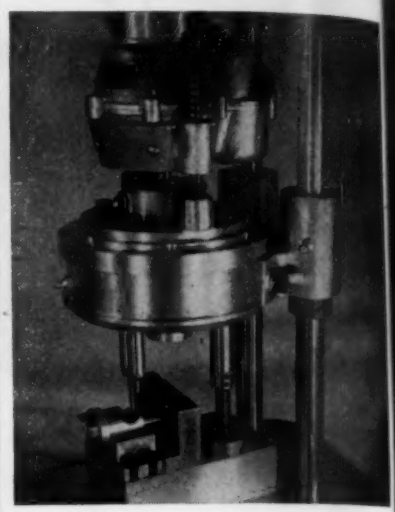
For more data circle No. 25 on postcard, p. 101.



Automatically separates stacked steel sheets

Employing the magnetic principle that like poles repel one another, a device automatically separates steel sheets of any shape. A permanent magnet induces a magnetic field in the stacked sheets which tend to repel each other, causing the ends of the sheets to fan out with air space between them. No matter what the coating on the steel sheets, the separator will float each sheet, making it a simple matter for operators to feed presses, brakes, shears. Four standard models handle sheets from 20 to 12 gage. *Basco Mfg. Co.*

For more data circle No. 26 on postcard, p. 101.
Turn Page



Precision tapping

The multiple tapping of two or more small holes can be done with lead screw protection on any drill press with Ettco-Emerick self-contained lead screw multiple tapping units. This is possible even though tap sizes, pitches, or both are not the same. The unit shown consists of a reversing head, a 3-spindle multiple head and a fixture; taps two 0-80 holes in aluminum. Lead screw, having a fast pitch, runs slower than the taps and is completely enclosed during operation, assuring precision tapping with long life. *Ettco Tool Co., Inc.*

For more data circle No. 27 on postcard, p. 101.

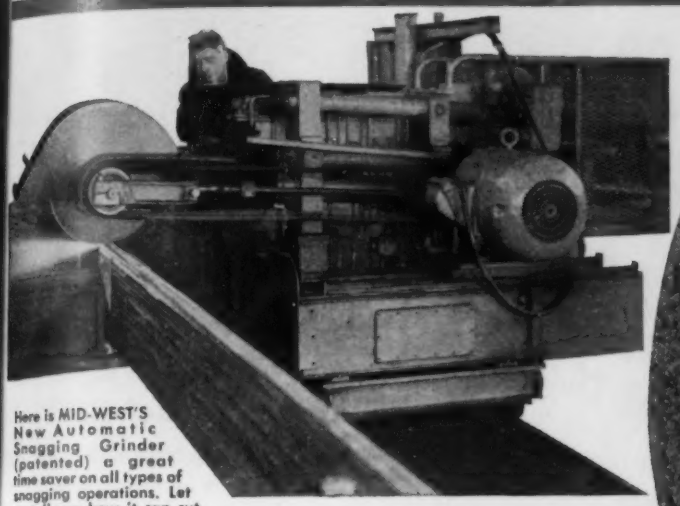
Magnetic clutch

New magnetic clutch that never requires adjustment is now incorporated in the automatic bar feed conveyer available for use with Peerless Mechani-cut hack sawing machines. With this equipment, it is reported the sawing cycle becomes 100 pct automatic following loading of the conveyer to completion of the last cut in the length of stock. The clutch has three main parts, the constantly-rotating center clutch plate, and two armatures, with which it is alternately engaged. One armature controls movement of the stock feed conveyer, the other operates the vise which clamps the work during the sawing out. *Peerless Machine Co.*

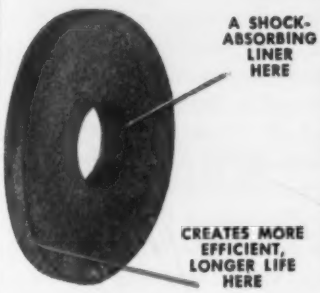
For more data circle No. 28 on postcard, p. 101.

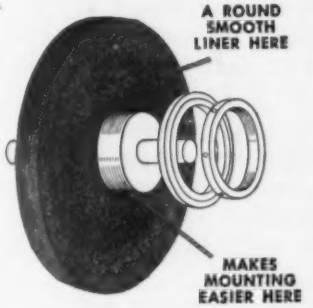
Turn Page

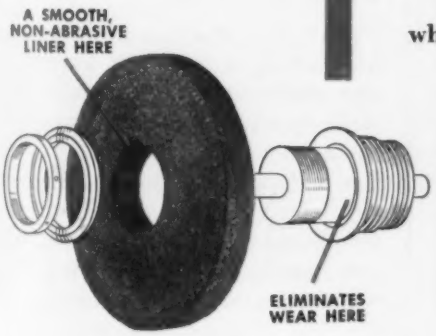
GREATER PRODUCTION...



Here is MID-WEST'S New Automatic Snagging Grinder (patented) a great time saver on all types of snagging operations. Let us tell you how it can cut costs on your grinding jobs.







... that's what you get when you use MID-WEST'S Fiber-Cushioned Snagging Wheels.

... and here are the reasons why they are better "on the job" wheels.

- **easier to mount.**
- **easier on your operator.**
- **easier on your spindle and bearings.**
- **easier on your work piece.**

Not only will Mid-West Fiber-Cushioned resinoid snagging wheels minimize the troubles so characteristic of snagging operations, but they're easier to mount, they're stronger, and they last longer.

The fiber-cushioned centers plus Mid-West's special resinoid bond, an extremely cool cutting bond, assures a highly satisfactory wheel life and increased production.

For complete information on these Fiber-Cushioned snagging wheels, write, wire or phone today.

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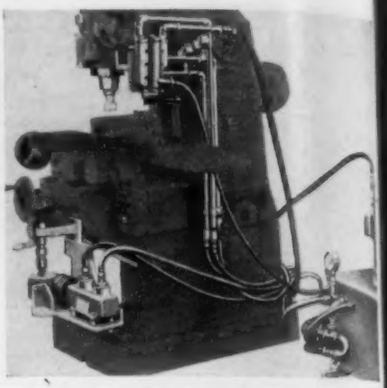
Executive Offices: 510 South Washington Street, Owosso, Michigan
Plants in Owosso, Michigan and Rochester, Pennsylvania



Copying attachment

A new Bondycop hydraulic copying attachment for milling machines permits the machining of complicated shapes, such as turbine blades, molded parts, plastic shapes, etc. It makes certain the uniform quality of the machined parts, avoids defective pieces, insures accuracy and is capable of both large and small runs. The attachment can be operated by unskilled labor. Is obtainable in several sizes. *Morey Machinery Co., Inc.*

For more data circle No. 29 on postcard, p. 101.

Easy dating

New steel date stamps mark tools, assemblies, any product, any material, clearly and indelibly. Sets consist of 12 individual stamps each bearing a key letter which changes annually and a number to indicate the month. Deep cut letters provide sharp, lasting impressions with a minimum blow. Character sizes are 1/16, ⅛ and 3/16 in. *Parker Stamp Works, Inc.*

For more data circle No. 30 on postcard, p. 101.

Flow control

For metering or controlling the oil flow in a hydraulic system, a new multi-range flow control valve is designed for operating pressure up to 3000 psi and offered in 2 and 3-port types in ¼, ⅜, and ¾-in. sizes for subplate mounting. Oil flow can be maintained at a uniform rate regardless of circuit pressure variation, insuring smoother operation and freedom from erratic motion. *Denison Engineering Co.*

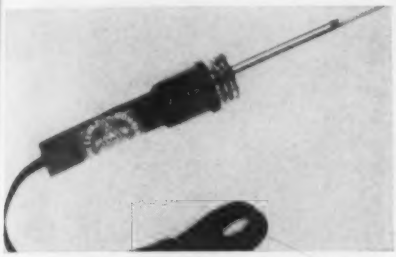
For more data circle No. 31 on postcard, p. 101.

Turn Page

Bolt heater

Greater bolt stressing is possible in large hollow holding bolts through the use of a new Corox bolt heater. Just as structural steel beams are fastened together securely by contraction of hot rivets as they cool, heated holding bolts on heavy steam equipment can be turned up tighter. As the bolts cool, flanges are drawn together to make leak-proof joints. The heater can be supplied in ratings ranging from 1000 to 6200 w, 120 v. Various sizes of heater elements permit installation in bolts 1 to 3 ft long and hole diameters from ½ to 1 in. *Westinghouse Electric Corp.*

For more data circle No. 32 on postcard, p. 101.



Light soldering iron

A light-as-a-feather pencil type electric soldering iron for industrial, professional, and hobby use weighs 2 oz and is available in wattage ratings of 25 and 40 w. Handle is cool, comfortable plastic; tip is ⅛ in. diam; overall length 7½ in. Recommended for soldering electronic components, precision instruments, radio and television parts. Its light weight and perfect balance materially reduce fatigue. *Lenk Mfg. Co.*

For more data circle No. 33 on postcard, p. 101.

Copper-clad steel

Spring properties comparable to hardenable steel are claimed for a new high conductive spring material. Conflex copper-clad hardened steel is a composite metal consisting of a layer of medium-carbon steel with a relatively thin layer of electrolytic copper clad to one or both sides. It has various thickness ratios; widths up to 8 in. and thicknesses from 0.050 in. down. *General Plate Div. of Metals & Controls Corp.*

For more data circle No. 34 on postcard, p. 101.

Turn Page

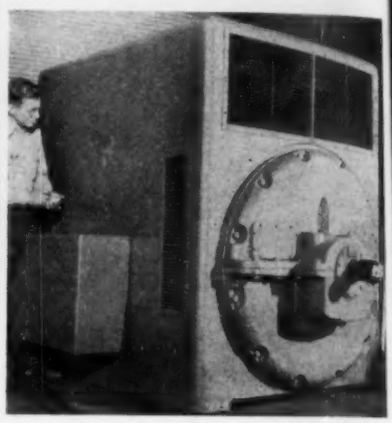
New Equipment

Continued

Radial bearings

Designated C Series, new precision ground radial bearings are the solid race type with ball retainers. They are made in inch dimensions which correspond to established light duty inch standard sizes, for light duty radial, thrust or combined lead applications and for speeds around 5000 rpm maximum. C Series bearings have ground and polished race ways and chrome alloy balls; available without shields, single shielded or double shielded. *Nice Ball Bearing Co.*

For more data circle No. 35 on postcard, p. 101.



Boiler-feed-pump motor

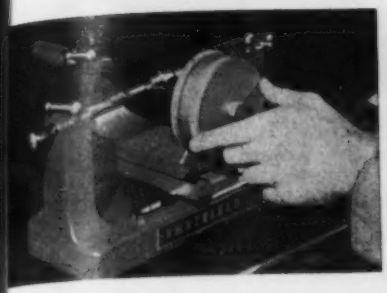
For use in power generating stations, new boiler-feed-pump motor is available in ratings of 1000 hp and larger. Improved ventilation system of the motor discharges the heated air away from workers and other nearby motors. Overall width has been reduced by cubical design. The high-speed rotor, designed to operate at 3600 rpm, receives special finish after grinding which aids in reducing turbulence and noise. *General Electric Co.*

For more data circle No. 36 on postcard, p. 101.

Special speed nut

New special J type Speed Nut shields the points of screws and provides against injury or product damage from screw point scratches. It is a variation of the standard J type Speed nut with a rigid integral flap curving up and back over the point of the screw where it comes through the nut. *Shakeproof Div., Illinois Tool Works.*

For more data circle No. 37 on postcard, p. 101.



Diameter measuring

Floating carriage diameter measuring machines check all diametral thread elements simply and accurately, and do not require the skill of a highly trained inspector. They are available in three models of different capacities: up to 4 in. with 8 in. between centers, up to 7 in. with 12½ in. between centers and from 6 to 12 in. with 14 in. between centers. Machines have sturdy cast iron base mounting two accurately aligned and adjustable centers. At right angles to the axis of the centers is a freely moving measuring carriage mounted on balls in V ways and carrying a micrometer and sensitive reference point indicator. Carriage permits measurements to be taken along the center line and at right angles to the work. Repetitive checking of similar components can be carried out rapidly and efficiently. Readings to 0.00001 in. can be made on the vernier scale. *Sheffield Corp.*

For more data circle No. 38 on postcard, p. 101.

Loadmeter

Used to control wear and limit breakage of carbide tools, the Loadmeter works on the ammeter principle to reflect motor capacity and percentage overloads. An auxiliary red pointer is set by the operator when the tool is dull and the machine pulls an overload. When the black hand reaches the overload point where the red hand is set, the tool should be changed. The device can be set for any motor from 1 to 50 hp, the dial being set for a specific motor. Damping of the current transformer protects the ammeter from initial starting surge. *Detroit Milling Cutter Co.*

For more data circle No. 39 on postcard, p. 101.

Turn Page

—New Equipment—

Continued

V link belting tool

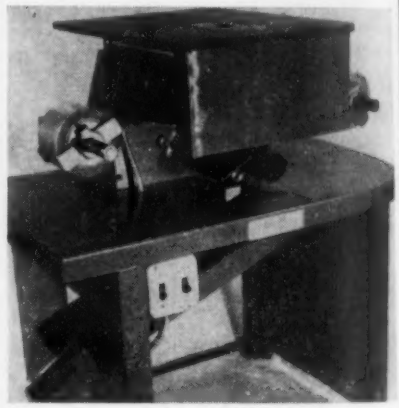
New prong-type tool, the Brammer-tool, speeds installation and adjusting of V link belting. A light pressure inserts ends of prongs into standard slots of V links. Another easy twist opens up the slots so that rivet heads can be quickly slipped in or out to make or break connections in the belting. *Brammer Corp.*

For more data circle No. 40 on postcard, p. 101.

New V-belt

Double ribbed V-belt for variable speed motors reduces internal friction and permits greater flexibility without sacrifice to strength. By application of the double-ribbed design, greater speeds and smaller diameters can be combined. This permits further design changes to develop greater horsepower within a smaller space. The result is maximum motor compactness. Varibelts are constructed of synthetic rubber compound, built up in layers, then cured under pressure in precision molds. *U. S. Electrical Motors Inc.*

For more data circle No. 41 on postcard, p. 101.



Sealed packages

The Auto-Pak automatically forms two sheets of heat sealing material around products, seals the four sides, cuts off and delivers a completely sealed package. The unit, which plugs into an ordinary light circuit, makes packages from 1 in. square x ½ in. thick to 6 in., square, from almost any heat sealing web, including cellophane, foil, etc. Speed is up to 40 packages per min when products are hand fed. *Pak-Rapid, Inc.*

For more data circle No. 42 on postcard, p. 101.

The Iron Age

SALUTES

George W. Wolf

He's a man of exceptional executive ability, thoroughly seasoned in shipping and "two-way" trade.

GEORGE WOLF espoused the principle that trade is a two-way street long before "trade not aid" became an international byword. And he has always practiced what he preached.

This is fairly typical of the way he approaches all problems; he is straightforward, incisive, realistic. He's inclined to meet problems head-on, but with a willingness to give and take. His reasoning is uncomplicated.

No one is ever long in doubt as to what he means or where he stands on a given question; he uses every possible means of communication in getting his thoughts across to his associates and the public.

As president of U. S. Steel Export Co. and the subsidiary Isthmian Steamship Co., he is a key official in the Corporation. His combination of background and personal traits make him a natural for these posts.

Born in Pittsburgh in 1892, he graduated from the U. S. Naval Academy in 1913 and served in various grades 'til he resigned in 1926 as Lieutenant Commander. He was awarded the U. S. Navy Cross for distinguished submarine service in World War I.

He joined General Motors Overseas Service in 1926, serving 12 years (10 abroad) before accepting leadership of U. S. Steel's export arm in 1938.

A keen student of business and economics, his work is also his foremost hobby. His forecasts are respected in the trade.

CONTROL
is our role!

On the seas, in a foundry or a steel plant . . . *control* is essential. It's the chief role of Keokuk Electro-Silvery in charging the cupola or blocking the open hearth. For with Keokuk, you are *assured* of *accurate* percentages of silicon . . . and, as suits your melt, alloys of manganese, chrome or nickel in various combinations. So, control both quality and costs with Keokuk. Write today for complete information!

KEOKUK
ELECTRO-METALS COMPANY
Keokuk, Iowa
Wenatchee Division: Wenatchee, Washington

In sailing, much depends upon control. Here, Chief Keokuk handles the tiller; Junior, the boom; and Princess Wenatchee makes ballasting an eye-popping pleasure!

Keokuk Electro-Silvery . . . available in 60 and 30 pound pigs and 12½ pound piglets . . . in regular or alloy analysis. Keokuk also manufactures high silicon metal.

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The Iron Age INTRODUCES

Joseph E. Berman, elected president and chairman of the board of directors, INDUSTRIAL METAL PROTECTIVES, INC., Dayton.

Sam R. Watkins, appointed executive vice-president, AMERICAN BRAKE SHOE CO., National Bearing Div.

David A. Coulter, elected vice-president, BRENHOLTS, GOIN & OGG, INC., Pittsburgh.

William F. Smith, appointed assistant to the vice-president and general manager, THE WESTERN EXPRESS CO., Cleveland.

O. D. Niedermeyer, named a vice-president, NICKEL PROCESSING CORP., and general manager of its nickel plant at Nicaro, Cuba.

Gordon A. Wiltse, elected secretary, THE PARKER-STREET CASTINGS CO., Cleveland; and **Albert F. Skok,** appointed assistant secretary and purchasing agent.

F. Dier Tincknell, elected treasurer, CHAIN BELT CO., Milwaukee, succeeding George M. Dyke, who has retired.

Arthur R. Cahill, elected assistant treasurer of INTERNATIONAL MINERALS & CHEMICAL CORP., Chicago.

Dr. Otto Kay, appointed director, Chemical Dept., SAM TOUR & CO., INC., New York.

Dr. Allen S. Russell, appointed chief of the Physical Chemistry Div., Aluminum Research Laboratories, New Kensington, Pa., ALUMINUM CO. OF AMERICA.

Thomas C. Jackson, appointed chief engineer, Michigan Limestone Div., U. S. STEEL CORP., Detroit; and **John E. Mattos,** promoted to manager —Heavy Products Sales, Columbia-Geneva Steel Div., San Francisco.

Marve Narramore, becomes staff assistant, DROP FORGING ASSN., Cleveland.

Joseph V. Schleisner, appointed chief engineer, THERMAL TRANSFER CORP., Pittsburgh; and **Robert J. Sahr,** named sales engineer.

Gordon M. Sommers, appointed chief engineer, Hamilton, Ohio plant, CLEARING MACHINE CORP.

Henry F. Arndt, named chief engineer, Detroit Electric Furnace Div., KUHLMAN ELECTRIC CO.

Maynard C. Miller, appointed sales engineer, Detroit office, COMMERCIAL CONTRACTING CORP.

Dr. C. Arne Arenberg, named a physical chemist, Armour Research Foundation of ILLINOIS INSTITUTE OF TECHNOLOGY, Chicago.

Clarence G. Walters, appointed assistant chief engineer, REPUBLIC STEEL CORP., Cleveland.

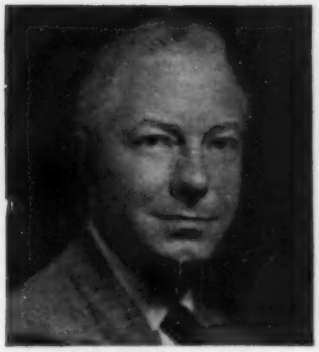
James L. Harvey, named an assistant engineer, Industrial Relations Dept., ALLIS-CHALMERS MFG. CO., Boston Works.

Donald W. Tait, appointed manager of sales promotion, Equipment Sales Div., RAYTHEON MFG. CO., Waltham, Mass.

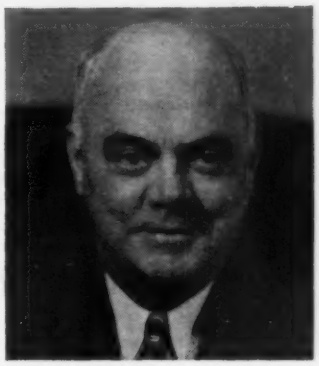
Miles W. Bixby, named superintendent, new fabricating plant, at Mansfield, Pa.; Fabricating Div., ARMCO DRAINAGE METALS PRODUCTS, INC.; and **Charles W. Hall,** becomes superintendent of the Ashland, Ohio plant.

P. D. Shollar, becomes manager, Procurement Dept., KOPPERS CO., INC., Pittsburgh, succeeding Royce D. King, who is retiring.

Duane S. Seavey, has been named Chicago district sales manager, BENJAMIN WOLFF & CO., Chicago; and **Herbert F. Peterson,** named manager of aluminum product sales.



ROBERT C. TRUNDLE, elected president, The Trundle Engineering Co., Cleveland.



E. O. BURGHAM, appointed vice-president, Weirton Steel Co., Weirton, W. Va.

F. J. KOEGLER, becomes vice-president, National Lead Co., and general manager, newly-formed Doehler-Jarvis Div.

Personnel

Continued

Wallace A. Gray, becomes a member of the sales staff, THE GIRDLER CORP., Votator Div., New York.

Russell, P. Colosi, appointed assistant to the Cleveland district sales manager, THE CARBORUNDUM CO.; **Charles J. Walter**, becomes office manager, Cleveland district; **Wilfred Robson** named office manager, Los Angeles district sales office; and **Joseph A. Marrone**, appointed assistant office manager, Chicago district.

Lee Johnson, promoted to assistant manager of service, CHICAGO VITREOUS ENAMEL PRODUCT CO., Cicero, Ill.

S. Gordon Saunders, appointed district manager, Detroit office and warehouse, BAY STATE ABRASIVE PRODUCTS CO., Westboro, Mass.

William L. Horr, promoted to district sales manager, Philadelphia Area, THE W. W. SLY MFG. CO., Cleveland.

John R. Hogan, appointed sales agent, Northeastern Ohio and Erie, Pa., THE H. F. BLACK EQUIPMENT CO., Cleveland.

James K. Hoyt, appointed assistant western manager, A. MILNE & CO.

Roger N. Perry, Jr., returns to Public Relations Dept., NORTON CO., Worcester.

Richard K. McConkey, appointed assistant general manager, Industrial Div., THE TIMKEN ROLLER BEARING CO., Canton, Ohio.

Raymond W. Herrick, named sales manager, Radio Div., ADMIRAL CORP., Chicago.

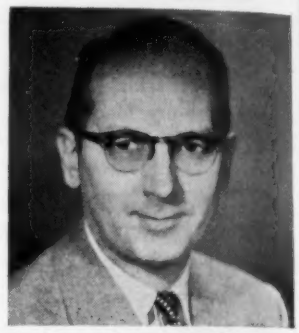
G. A. Tamblyn, appointed sales manager, THE FRANK G. HOUGH CO., Libertyville, Ill.

A. C. Brown, Jr., appointed general sales manager, AIR REDUCTION SALES CO., New York.

Harvey R. Hiller, appointed general sales manager, LACLEDE-CHRISTY CO., St. Louis.

James O. Clevenger, appointed sales manager, general industrial products, WESTINGHOUSE ELECTRIC CORP., Pittsburgh; and **James P. Coughlin**, becomes manager, Welding Dept., in Buffalo.

JOHN D. SMALL, elected vice-president, Pressed Steel Car Co., Inc., New York.



ROBERT H. ZOLLER, elected president, newly formed Melting Research, Inc., Bettsville, Ohio.

I. JOSEPH STUBINSKI, promoted to secretary, Keystone Drawn Steel Co., Spring City, Pa.

PAUL B. JESSUP, appointed treasurer, Kennecott Copper Corp., New York.

Have you investigated

"BORON STEELS"

as a ready means to increased hardenability?

Farm equipment and earth-moving machinery manufacturers are using boron steels for axles, spindles, drive gears and many other heavy section parts.

Boron steels—used for pinions, shafts and heavy-duty gears for air-cooled engines—are helping to meet new requirements in the aircraft industry.

In gears, pinions, axles, springs and many other automotive parts, older grades of alloy steels are now being replaced by boron steels.

Boron steels are enabling manufacturers of hand tools and shop equipment to make significant cuts in their annealing costs.

Millions of tons of boron steels made with Vancoram GRAINAL Alloys are now in service.

These steels are doing many of the jobs formerly done only by the older grades of higher alloy steels. They contain, however, far smaller amounts of critical alloying elements—because GRAINAL Alloys replace these elements with respect to hardenability.

If you are having trouble getting steels with the hardenability you require, investigate boron steels today.

Ask your steel supplier for complete information.

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VANCORAM

Producers of alloys, metals and chemicals

Personnel

Continued

Carleton P. Adams, appointed advertising manager, THE YALE & TOWNE MFG. CO.; and **Newcombe C. Baker, Jr.,** appointed manager, Special Sales promotion, The Yale Materials Handling Div., Philadelphia.

C. Lynn Frost, appointed advertising manager, HEWITT-ROBINS INC., Stamford, Conn.

John R. German, appointed purchasing agent, SHELLEY STEEL CORP., Chicago.

George W. Urban, appointed purchasing agent, THE CLEVELAND CRANE & ENGINEERING CO., Wickliffe, Ohio, succeeding Henry Karr, who has retired.

Clyde Smith, appointed sales representative in Southern Ohio, ADAMAS CARBIDE CORP., Harrison, N. J.

William J. Pethick, named assistant purchasing agent, THE SAFETY CAR HEATING & LIGHTING CO., INC., New Haven, Conn., succeeding **A. B. Swartz** who has retired.

J. T. McMurphy, appointed special television representative, Texas, Southern and Southeast Div., PHILCO CORP.

W. C. Tagmyer, appointed Northern California agent TUBESALES, Los Angeles.

T. Wayne Warren, becomes supervisor of research in refinery technology, Detroit research laboratories, ETHYL CORP., New York.

Francis E. Honsa, appointed exclusive representative, Southern Connecticut area, LEWIS-SHEPARD, Watertown, Mass.

E. M. Woodrich, recently joined CHASE BAG CO., Chicago, and will handle the Oklahoma territory.

William B. Morse, appointed manager, Detroit branch, FAIRBANKS-MORSE & CO., Chicago, and **B. R. Eng** appointed assistant comptroller.

OBITUARIES

W. Raymond Steele, secretary, The E. D. Clapp Mfg. Co., Auburn, N. Y., recently.

John M. G. Parker, Sr., former sales manager, Lamson & Sessions Co., and a former vice-president of Moore-Handley Hardware Co., Birmingham, Ala., recently in Birmingham.

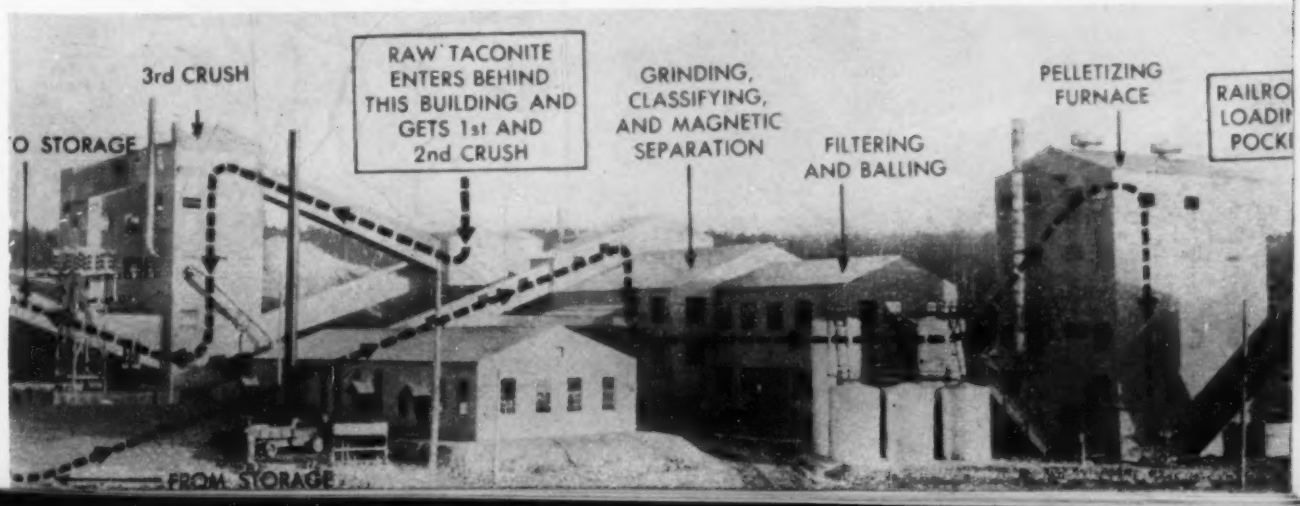
The Iron Age
FOUNDED 1855
Technical Articles

Limited open pit mining.

TACONITE— Mesabi's Answer To The Iron Ore Shortage

What Does Taconite Mean To You?

1. Guarantees steel products under any conditions.
2. Creates strategic stockpile in open-pit reserves by supplementing existing supplies.
3. Guarantees steel supplies at lowest possible price.
4. Prevents dislocation of existing steel production, consuming centers and transport lines.



Coming manufactured ore process.

TACONITE—BIG THREE ARE UNDERWAY

Mining Company	Plant Location	Owners	Planned Tonnage	Present Production (thousands of tons)	Investment ($ millions)	Products	Estimated Production (Thousands of gross tons)				
							53	54	55	56	57
Reserve Mining Co.	Babbitt[1] Beaver Bay[2]	Republic Steel Corp. –50 pct Armco Steel Corp. –50 pct	3¾ million[3] 10 million	300 ...	160 250[4]	Pellets 65 pct Fe	300	300	1300	2800	3375
Erie Mining Co.	Aurora[5] Pilot Plant	Youngstown Sheet & Tube Co. –35 pct Bethlehem Steel Corp. –45 pct Interlake Iron Corp. –10 pct Steel Co. of Canada –10 pct	10½ million[6]	200	298	Pellets 65 pct Fe	200	200	200	200	5000
Oliver Iron Mining Div.	Mt. Iron[7] Virginia[8]	U. S. Steel Corp. –100 pct	500,000	Just begun	23 plus	Sinter and Nodules 60-65 pct Fe	500	500	500	500	500

[1] In operation. [2] To be built. [3] Initial tonnage. [4] Estimated total investment for 10 million ton production. [5] Pilot plant operating. [6] Eventual tonnage after new plants are built. [7] Crushing grinding magnetic separation only. [8] Concentrating plant 6 miles from Mountain Iron.

Taconite To Date

WHAT—Taconite is hard quartz rock containing 24 to 30 pct Fe. It is composed of iron oxides, silicates and carbonates and occurs as two types of iron ore: one magnetic Fe_3O_4, the other nonmagnetic, Fe_2O_3.

WHO—Companies with beneficiation plants in Minnesota are: Reserve Mining Co., Erie Mining Co. and Oliver Mining Co. Seven major steel companies are backing the three taconite producers.

WHEN—Present production is 1 million tons of concentrated ore (64-65 pct Fe) per year. By 1958 capacity will expand to 8,875,000 tons and will later reach 25 million tons.

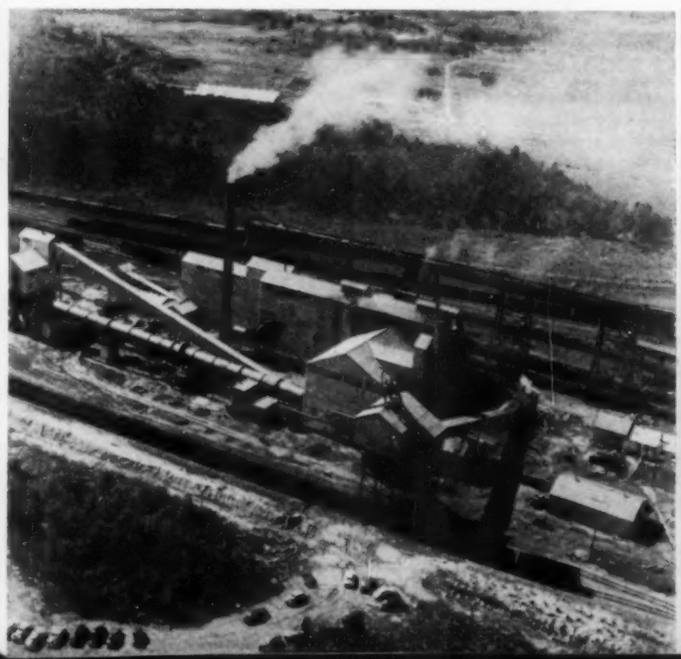
WHY—High grade open pit ores which do not need beneficiation are diminishing.

RESERVES—Unlimited—billions of tons.

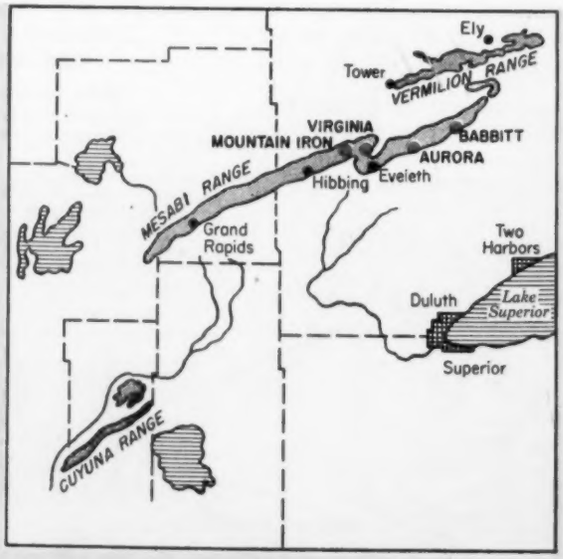
INVESTMENT—To date the above companies are committed to a total of between $700 to $800 million to make 25 million tons a year.

PRICE—Producers will not discuss cost or price. But Mines Experiment Station, Minneapolis, Minn., estimates taconite at $9.53 per gross ton of pellets delivered to Lower Lake Ports.

Taconite agglomeration plant in production by The Oliver Mining Co. at Virginia, Minn.



Colored dots show locations of taconite plants on this map of the Minnesota iron ore mining area.



Wraps are off—

Reserve Mining REVEALS BENEFICIATION PROCESS

◆ Babbitt plant of Reserve starts mining 1½-billion ton magnetic ore field . . . It takes 1¾ man hr to manufacture one ton of agglomerated pellets.

◆ Processes three tons of ore for every ton of concentrate obtained . . . Plant can turn out 300,000 gross tons per year of 65 pct Fe ore.

◆ Primary concentrated feed is —10 mesh, 70 pct solids, fed alternately through magnetizing or demagnetizing coils . . . Anthracite coal plus Bentonite used to make filter cake . . . Pellets are hard and dense, run 1 to 2½ in. in diam.

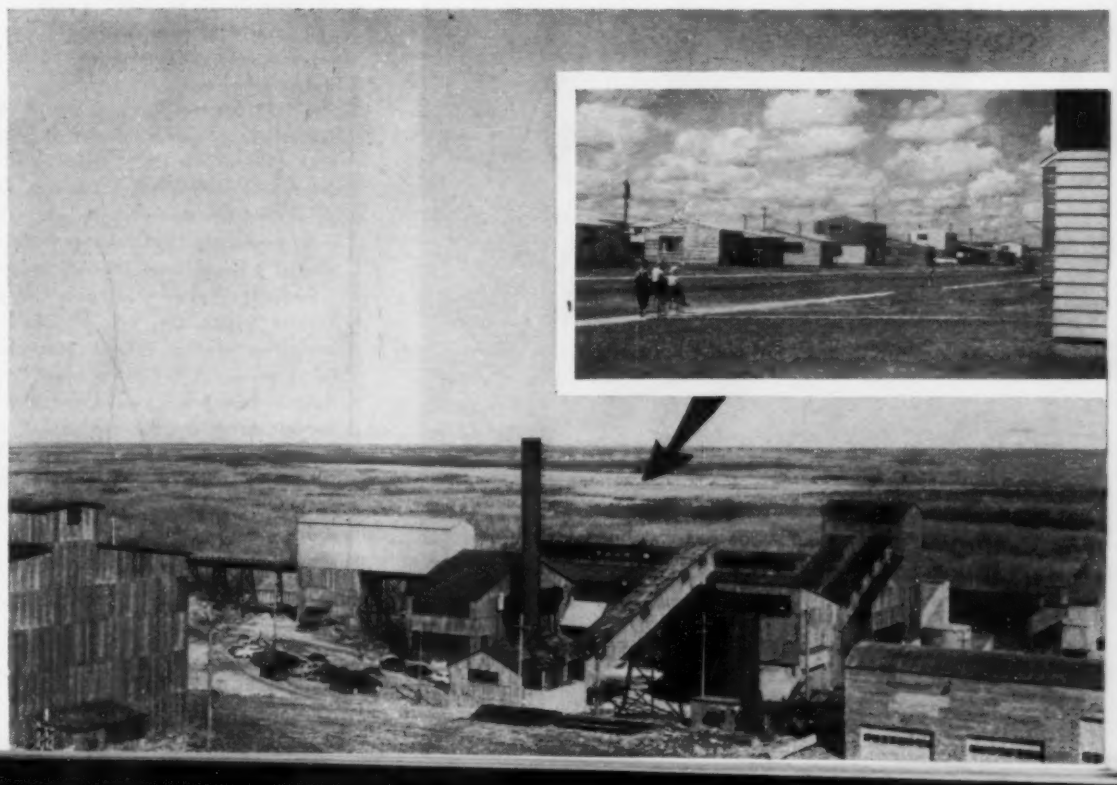
◆ THE MESABI IRON RANGE is not on its last legs. Those who work the once fabulously rich ore field don't think things are going to pot. Neither do mining and steel companies that are pouring millions into the area in long term investments.

Iron ore companies, backbone of Minnesota economy, are banking on taconite to recapture the glory of the range. They may be wrong. But before anybody writes them off there will be plenty of activity on the old range.

Taconite is not a rich ore. It contains only 24 to 30 pct Fe, but there are untold millions of tons of it scattered all over the iron country of Minnesota and Michigan. Everyone concedes that high grade shipping ores mined from open pits are petering out; they concede that shaft mining of these ores may be too costly. But they don't concede the end has come. In taconites Mesabi followers see the beginning of a manufacturing era to replace the old-type mining industry.

It requires ½ man hr per ton to pit mine high grade hematite. It takes about 1¾ man hr

FIG. 1—Reserve Mining plant showing main crusher building, extreme left, secondary crusher building and concentrating plant, center, and pelletizing building, lower right. The company-built town of Babbitt seen in the distance is pictured in the insert.



Darwyn I. Brown, Technical Editor, enjoys the distinction of being the first outsider to be permitted to go through and study a taconite plant. The author spent many days with the Reserve Mining Co.'s engineers in the plant and on the range. This article has been in preparation for over a year.

per ton to manufacture agglomerated taconite. This 3½ to 1 ratio in employment will be shaved but it remains an important point demonstrating that the problems of producing taconite are now far overshadowed by its possibilities.

Range statistics show that 1000 men in the mines supply 2000 other jobs in supplementary employment. With an average state mine employment of 14,000 over the last 10 years available labor may become, next to water supply, the biggest single problem.

Since 1942 Reserve Mining Co. has conducted extensive geological study of a property which contains over 1½ billion tons of magnetic taconites. Technical studies of each step in the milling processes were pushed at the State Mines Experiment Station. Water supply, railroad right-of-way and a harbor site on Lake Superior were secured. A $1 million pilot plant was built at Ashland, Ky., to perfect a pelletizing process for agglomerating the ore.

Reserve engineers worked with Linde Air Products Co. in developing the fusion-piercing method of boring blasting holes in the hard taconite which speeded drilling operations.

Taconite ore is hard, dense quartz rock composed of iron oxides, silicates and carbonates. There are two major types. One contains nonmagnetic hematite, Fe_2O_3; the other contains magnetite, Fe_3O_4. The latter ore need only be crushed, sized and separated from the tailings by wet magnetic methods and then agglomerated into blast furnace charge ore.

FIG. 2—Small portion of the deposit is stripped ready to be mined. Arrow points out oxygen pipeline.

Three tons of taconite must be processed for each ton of high grade concentrated ore shipped. Reserve is concentrating its immediate effort in the magnetic type and the progress is being carefully watched by the industry.

Reserve Mining Co., jointly owned by Republic Steel Corp. and Armco Steel Corp., is in the middle of a taconite program to the tune of $160 million to date. Its new plant at Babbitt is in production and can turn out 300,000 gross tons per year of better blast furnace ore than nature produces. Babbitt, a new town, is rising out of the wilderness.

— BACKGROUND —

Taconite is not new. In fact the first reported discovery of ore on the Mesabi range by Peter Mitchell in 1871 was the ore we now call taconite. When Mitchell dug the first 4 ft-deep test pit near the present town of Babbitt, he didn't uncover high grade ore. His discovery, however, stimulated the search and it was not until 20 years later that the rich Missabe Mt. and Biwabik mines were found.

In the 70 years that followed the taconites were generally neglected in preference to the higher grade ores. Oglebay, Norton & Co. did diamond-drill the Babbitt area in 1900. In 1914, the Mesabi Syndicate (later known as The Mesabi Iron Co.) was formed and this company proved that millions of tons of taconite existed. Mesabi Iron built a pilot magnetic concentration plant in 1916, in Duluth, and established a satisfactory process for the manufacture of high grade ore from taconite by using wet magnetic concentration methods which processed finely-crushed ore.

In 1919, Mesabi Iron Co. built a 500-ton per day commercial taconite concentrator at Babbitt which operated until 1924. Over this period about 150,000 tons of sintered-taconite concentrate were shipped but the program died because taconite at that time was economically premature. But a few years later it became a commercial product from the Adirondacks.

Realizing the eventual potentialities of taconite, the Reserve Mining Co. was organized and took over the properties of the defunct Mesabi Iron Co. in 1939. For 3 years the project marked time. But in 1941 the state of Minnesota passed the now famous taconite-tax law sponsored by the people but consummated mostly through the efforts of John Blatnik, Congressman of St. Louis County, which exploded the biggest roadblock to full utilization of these low iron bearing ores. This spark set off a blaze of activity which has steadily grown in intensity.

FIG. 3—Jet-piercer has speeded drilling and is a big factor in permitting economic utilization of this extremely hard ore. Jet burns oxygen and kerosene.

FIG. 4—Author inspects business end of the Linde Jet-Piercer now drilling the taconite at Babbitt.

By 1957 the main Reserve plant at Beaver Bay will be ready to turn out 3,750,000 gross tons annually of pellets containing 65 pct Fe (tonnage will be raised later to 10 million tons). By then the other two major taconite developers, Erie Mining Co. and Oliver Mining Co., will be producing in tonnage. Along with Reserve, they will be shipping ore down the lakes at the rate estimated in the table.

Reserve in June, 1951, started rehabilitation of the old plant at Babbitt. This plant, Fig. 1, has just begun operations. The first unit of the larger plant to be built at Beaver Bay on Lake

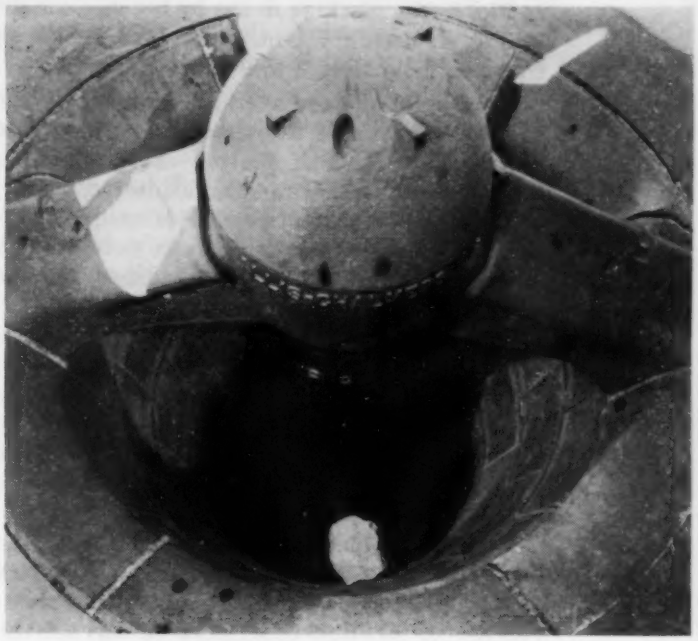
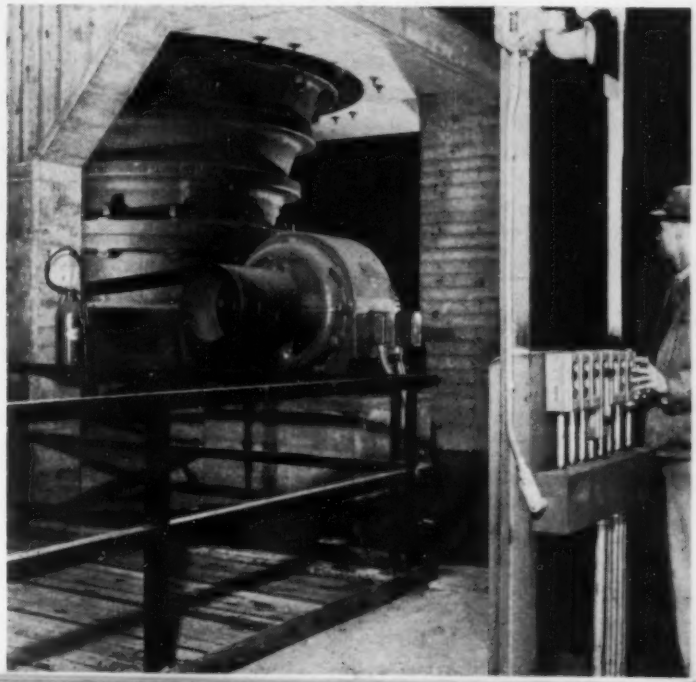


FIG. 5—Taconite is trucked from the mine and dumped into this 42-in. gyratory coarse crusher which breaks the large rock down to 8-in. maximum size.

FIG. 6—Discharge level of coarse crusher shows the 300-hp motor and controls. This crusher built by Allis-Chalmers is equipped with a hydraulic cushion to prevent excessive wear and tear of the equipment.



Superior will be patterned after the experience gained at Babbitt.

The ore body now being worked at Babbitt is located about 2 miles from the crushers. At present the first bench is being cut in the field which will eventually be a 9-mile long pit. The ore for the Beaver Bay operation will also be shipped from this pit over a 47-mile railroad to be built later.

The overburden on this portion of the field, shown in Fig. 2, ranges from none to 10 to 15 ft. Average overburden is around 8 ft. Blasting holes are being cut into the taconite with the Linde Jet-Piercing machine of the type shown in Fig. 3. The machine in use by Reserve, shown in Fig. 4, uses a 7½-in. pipe which drills an irregular hole from 8 to 9½ in. in diam.

Piercing of the ore averages 18 to 20 ft per hr which is almost ten times faster than the best drilling rates of the old churn bits. In addition to the usual rammed explosive, a free-flowing water resistant powder is used in preference to stick dynamite. This is necessary in order to fill all the voids produced by the irregular holes made by jet piercing.

The Jet-Piercer at Babbitt can cut holes up to 40 ft deep. The machine burns oxygen and kerosene. The 4000°F jet flame is followed by a water spray which spalls off the rock. The steam generated helps propel the rock particles out of the hole and through the exhaust pipe to the floor of the pit.

Oxygen is piped around the field from the main line and water and kerosene are carried on cat-pulled skid platforms. Much less maintenance of drilling machinery is one of the attractive features of this machine which has solved the tough problem of how to economically mine the taconite ore.

The ore is now hauled by truck to the coarse-crushing building. Rail hauling will soon replace the trucks. The new 42-in. Allis-Chalmers gyratory crusher, Fig. 5, crushes the ore down to a 8-in. maximum size. Pieces as large as 36 in. can be handled by this crusher which is powered with a 300-hp motor shown in Fig. 6. The crusher has a capacity of 1000 tons per hr. It is equipped with a hydraulic cushion which is expected to keep maintenance of the crusher down to a minimum.

The crushed ore, 8-in., feeds by gravity into the second crusher which is a 30-in. A-C gyratory type of 500-ton per hr capacity. Only one of these crushers is now installed but foundations are ready if and when another secondary crusher is required.

The ore is crushed to 3½-in. maximum size in the second crusher and falls into a 30-ton surge bin. Fig. 7 shows the flow sheet through the coarse and fine-crushing plant. The entire crushing plant is equipped with extensive dust collecting systems.

From the two 1800-ton surge bins the ore is bottom fed over vibrating feeders onto 30-in. wide rubber belts which deliver the feed to the

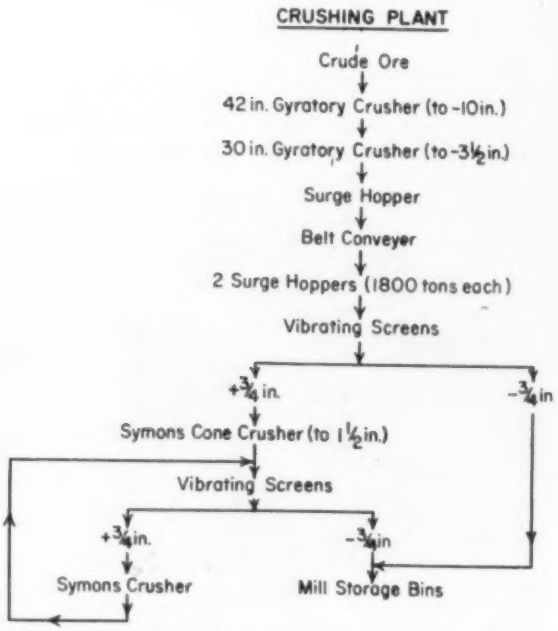


FIG. 7—Flow chart of the coarse and fine-crushing departments of the Babbitt plant.

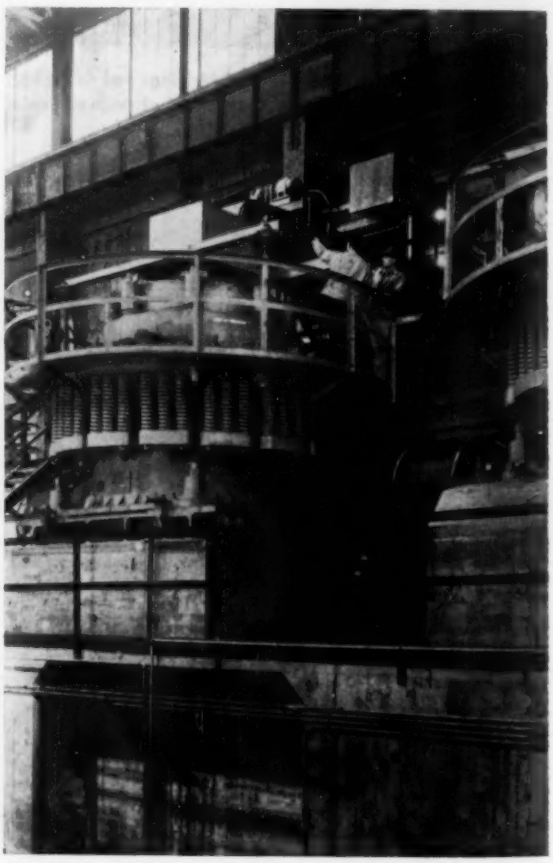


FIG. 8—Two Symons cone-type crushers break the ore down to minus ¾-in. size. Maximum capacity of both Nordberg crushers is about 480 tons per hr. Operator is pointing to conveyer belt which feeds ore into top of crusher. Crusher discharges onto another belt.

top of the fine-crushing plant. Each of these belt conveyers in parallel can move 800 gross tons per hr at a maximum rate of 350 fpm.

The ore is then roll fed over vibrating screens to the short belts which dump the feed into the top of the two Symons cone-type crushers shown in Fig. 8. Each of these crushers can work on either an open or closed crushing circuit as shown on the flow sheet. These Nordberg crushers take the ore down to —¾ in. size. The maximum capacity of the coarse-crushing plant at Babbitt is 480 gross tons per hr.

No special problems have been encountered in the concentration of magnetic taconites. The methods of concentration to be described next offer a wide choice but concentration per se has not held up the utilization of this ore. Agglomeration or pelletizing, however, has been a major problem particularly on a tonnage basis. Reserve Mining Co. is confident that it has satisfactorily solved these major problems through extensive research.

Pellets made at Ashland, Ky., have given satisfactory performance in blast furnaces wherein all pellet ore burdens from 35 to 70 pct were used. Indications are that less coke and limestone are consumed per ton of iron produced when using pellets.

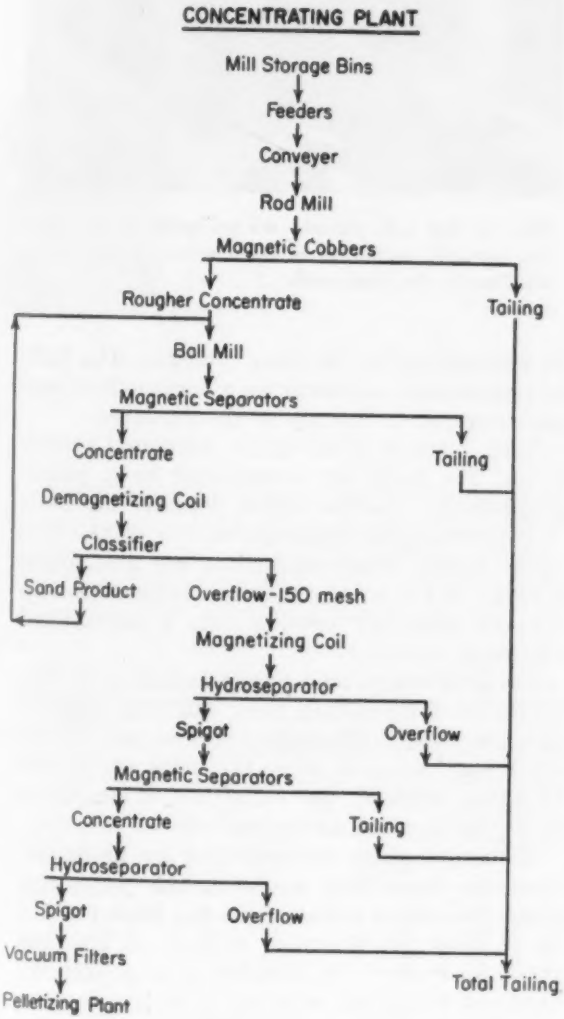


FIG. 9—Flow chart of concentrating plant shows details for handling feed and tailings.

The flow sheet, shown in Fig. 9 depicts the concentrating plant. Here water is introduced into the system from the 1.6 million-gal storage tank shown in Fig. 10. Fresh water into this tank is brought up from Birch Lake by two 2000-gpm pumps through a 20-in. diam pipe. The tank is 285 ft above the lake level. From the mill storage bins the feed is conveyed into rod mill shown in Fig. 11.

The rod mill product is —10 mesh, 70 pct solid material which is discharged through a magnetizing coil prior to entering the Akins classifier. The rod mill revolves at 16.5 rpm and can process a maximum of 120 tons of feed per hr. This mill is driven by a 700-hp motor.

The feed is magnetized prior to entering the classifier as small iron particles would otherwise go out the overflow and be lost in the tailings. Increasing the residual magnetism of the small iron oxide particles causes them to attract each other, ball up and collectively weigh enough to sink to the bottom and be raked out the top of the classifier. These iron-rich fines thus stay in the system with the rest of the larger sized feed.

Magnetic cobbers important units

The now partially concentrated ore feeds into the two magnetic cobbers. These cobbers or roughing magnetic separators drawing a maximum of 9 kw each, remove about 35 pct of the feed and are an important unit in the concentrating plant. The product from the cobbers will average about 68 pct solids.

From the cobbers the feed goes through the ball mills, Fig. 12, and into magnetic separators. The concentrate from these separators is then demagnetized before entering the Akins classifier. If the feed were not demagnetized at this point too much of the product would stay in the ball-mill circuit. When demagnetized the iron oxide particles break away from each other, rise to the surface and go out the overflow which, in this case, is feed not tailings.

The feed is again immediately remagnetized prior to entering the first hydroseparator. Two 850-gpm pumps deliver the feed to this hydroseparator. Here again small particles of iron oxide are not desirable as they tend to rise with the water column and go out the overflow to the tailings pond also shown in Fig. 10. The product from this hydro unit will average about 60 pct solids and the feed is run through the final battery of eight drum-type magnetic separators.

After this final magnetic separation the concentrate is piped to the last hydroseparator and then run into the vacuum drum filters. The product pumped into the drum filter averages about 62 pct solids. Anthracite coal of —100

FIG. 10—Water storage tank, center, holds 1.6 million gal. Tailings pond is shown at left. Flow of ore through beneficiation process is from coarse-crusher building, right, to rail cars at end of pelletizing building, left.

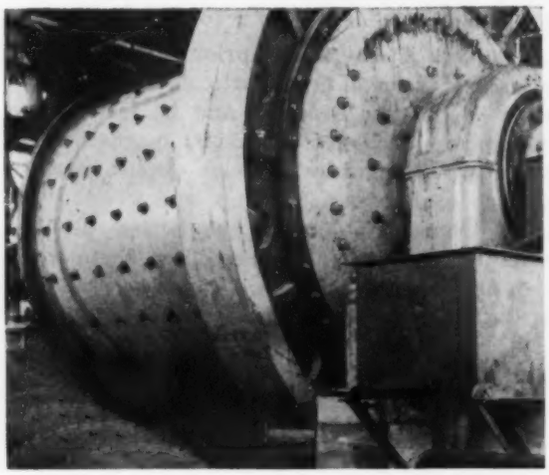


FIG. 11—The rod mill breaks the ore down to —10 mesh and discharges 70 pct solids through the magnetizing coil, at right, before feed enters Akins classifier.

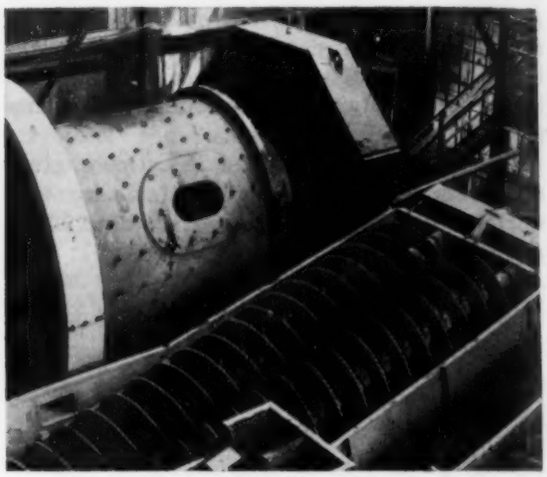


FIG. 12—Ball mills pulverize the ore which is then fed into magnetic separators before it enters the two rake classifiers in the foreground.

mesh is automatically mixed with the concentrate before entering the drum filters.

About 1 to 1.5 pct by weight of coal is added to the concentrate and 10 to 15 lb of Bentonite per ton is also added at this point.

The concentrate pumped into the drum filters contains about 40 pct moisture. The finished filter cake out of the drums contains only 9 to 10 pct moisture. The two bins which hold the filter cake will accommodate 800 tons each. The filter cake contains about 65 pct Fe and filter cake production at full capacity is expected to average 43 tons per hr.

The filter cake bins hold enough concentrate to allow the pelletizing plant to operate should the milling production slow down or stop.

The pelletizing plant recently completed is now in production. This plant contains four balling drums and four vertical furnaces.

The filter cake is fed into the revolving drums which ball up the moistened concentrate. The turning speed of the drum and its angle of tilt can be varied to make different size pellets or to rectify different physical conditions that may be encountered in the filter cake mix. The balls of concentrate discharge on a screen chute and are conveyed to the top of the furnaces.

Each furnace is fed by an individual balling drum. The balls are distributed by a pantagraph-feeding device which deposits the balls in a predetermined pattern on top of the furnace charge. Finished pellets are discharged through the two chutes at the furnace bottom through vibrating screens onto a mechanical vibrating conveyer.

The pelletizing furnaces are fuel-oil fired. The maximum temperature zone will run between 1800° to 2200°F. These furnaces do not require much heat input as after the balls are heated to about 1200°F, the reduction of Fe_3O_4 to Fe_2O_3 takes place exothermically.

Elaborate plans for recycling by automatic conveyers have been made in the pelletizing plant. The initial pellets made ran from 1 to 2½ in. in diam but the most economical size has yet to be worked out. The hematite pellets are hard and tough but melt easily at iron-making temperatures.

Photo credits: p. 127 (top) Oliver Iron Mining Div., (bottom) Erie Mining Co.

Manganese replaces nickel—

New Austenitic Stainless GOOD ALTERNATE FOR 18-8

♦ Manganese, as well as nickel, is an austenite former. But about twice as much Mn is needed for the same results. Analysis is 16 Mn, 16 Cr, 1 Ni.

♦ New stainless is fabricated with no changes in method or tooling. Tool wear unchanged . . . Weldability is excellent . . . Formability, strength, fatigue and corrosion resistance compare closely with type 301.

By R. L. Hatschek
Associate Editor

♦ STAINLESS STEEL is the best structural material available for trailers and railway cars, according to the Budd Co., Philadelphia. Under present wartime conditions, however, it is illegal to use stainless containing more than 1.0 pct nickel for these and many other civilian products.

These are the conditions that started a search for another grade of stainless to do the job of the high-nickel 300 series. The job had to be done as well and as easily as with type 301 (17 pct Cr, 7 pct Ni).

Type 430, a straight chrome grade was unsuitable for Budd's use because the high physical strength of the 301 previously used could not be obtained. Type 430 is not as easily worked, and the weld properties are not as good as 301.

Manganese, like nickel, has the property of producing an austenitic structure in steel, though it takes about twice as much to do it. TRC, so designated for its first commercial application by Budd as a Trailer-Rail Car steel, has an analysis of: 15.0 pct Cr minimum; 16.50 pct Mn nominal; 0.10 pct C maximum; and 1.00 pct Ni maximum. It may also contain a nominal 0.15 pct N_2. It is produced by a number of steel companies.

Fabrication of stainless at The Budd Co. is typical of sheet working plants in general except that little stamping and deep drawing is done. Side and roof panels are corrugated by pulling

TABLE I

TENTATIVE PHYSICAL PROPERTIES FOR TRC SHEET

Condition	Sheet Thickness, Inches	Finish	Yield Strength, Minimum, psi	Ultimate Tensile Strength, psi		Elongation, Minimum, pct	Bendability		Rockwell B
				Minimum	Maximum		Radius	Angle	
Fully Annealed	Under 0.020	2D	40,000	80,000	115,000	50	OR	180°	85
	Under 0.020	2B	45,000	90,000	120,000	40	½T	180°	195
¼ Hard	Under 0.020	2B	75,000	120,000	150,000	25	½T	180°	.....
	0.020 and over	2B	75,000	120,000	150,000	25	1T	135°	.....
½ Hard	Under 0.020	2B	110,000	140,000	165,000	15	½T	180°	.....
	0.020 to 0.156	2B	110,000	140,000	165,000	15	2T	135°	.....
	0.156 and over	2B	100,000	125,000	165,000	15	2T	135°	.....

TRC is largely used in a cold-rolled mill finish condition and is sanded for some applications.

stainless sheets through form rolls in a draw-bench as in Fig. 1. They are joined into wider panels by seam-welding as shown in Fig. 2.

Structural sections like purlines and carlines are formed of strip on a power brake. Typical cross sections can be seen in Fig. 3. Most joining is done by the Budd-developed Shotweld method, a closely controlled resistance weld made with high current for a time period of only a few cycles. Fig. 4 shows a roof section being welded in place by this method.

Some arc welding is also done but there are practically no machining operations—these being confined mainly to drilling. The company does not heat-treat these parts. In Fig. 5 several self-propelled Rail Diesel Cars can be seen nearing completion. These cars are built of TRC stainless.

Some 400 to 500 tons of TRC have now been used by the firm with no tooling changes of any sort from the previously used 301 stainless. With the possible exception of slightly greater drill wear (not actually tested), there has been no apparent change in tool or die life.

TRC is the complete equivalent of type 301, according to Budd, and tentative physical characteristics are almost identical (see Table I).

To date, insufficient time has elapsed to establish definitive corrosion resistance data between TRC and 301. Table II shows average values for two specimens of each sample. Test pieces were cut to 3 x 3-in. and sheared edges were removed on an emery belt. Before exposure, the samples were cleaned with ether to remove grease and other contaminants.

Specimens were removed from solutions twice weekly and kept out for 24 hr. Solutions were renewed weekly and samples were rinsed with water to remove corrosion products at the same time. At the end of 1 month, samples were checked, cleaned and reweighed. Ratings were given on the basis of: No evidence of pitting or general attack, 5; mild to severe attack, 4 to 1; and very severe attack, 0.

One of the things checked between TRC samples A and B (Tables II and III) was the effect of lowering Cr content from 16.38 pct to 15.23 pct. It was found that this did not materially affect the corrosion resistance of the metal.

In a 100-hr 20 pct salt spray test, TRC specimens showed very mild attack, a shade less than 430 samples, while type 301 showed no signs of attack. Budd's metallurgists stress that this test, as well as laboratory tests, do not necessarily indicate the service characteristics of any material and should be evaluated with the utmost care.

Short of examining rail cars and trailers that have been in use for a number of years, the most informative test is extended exposure to various atmospheric conditions. Such tests have been under way for about 1 year in several industrial areas including Pittsburgh, New York, Philadelphia and Niagara Falls. Samples are also exposed in rural areas and at the International Nickel Co. testing station at Kure Beach.

No final corrosion evaluation has been made of the Kure Beach sample yet. Because of a variation in test procedure, the specimen in the high chloride Niagara Falls atmosphere has not been evaluated. But all others, such as one placed on top of an industrial plant at the intersection of two railroads in Philadelphia, showed absolutely no evidence of corrosion. Budd's confidence in the corrosion properties of TRC is indicated by its complete acceptance of the material.

TRC is largely used in a cold-rolled mill finish condition and is sanded for some applications. In this condition, it is difficult to detect the minute color difference between TRC and 301 even when

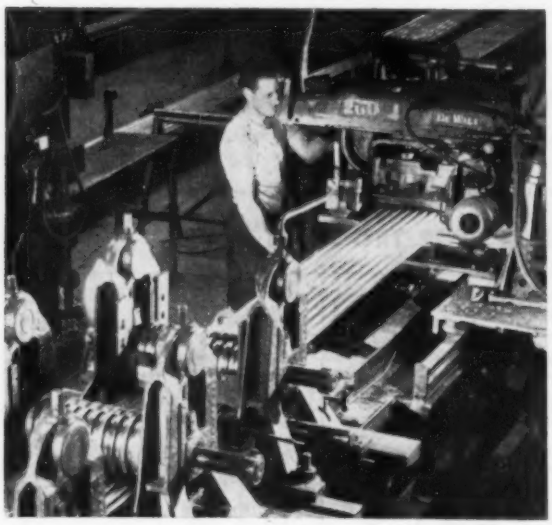


FIG. 1—Typical draw-bench operation shows stainless sheet being pulled through rolls to form section.

FIG. 2—Seam-welding a trailer side. Six corrugated sheets and edge are simultaneously joined.

TABLE II

LABORATORY CORROSION TEST RESULTS

			Acetic Acid, 5 pct at room temp.	Nitric Acid, 5 pct at room temp.	Sulfuric Acid, 5 pct at room temp.	Salt Solution, 5 pct at room temp.	Calcium Chloride, 5 pct at room temp.	Potassium Hydroxide, 5 pct at room temp.
TRC Sample A	Weight in grams	Start	19.8289	20.2335	20.1025	19.8650	18.7930	19.3226
		Final	19.8289	20.2335	18.0704	19.8499	18.7720	19.3220
		Loss	0	0	2.0271	0.0151	0.0210	0.0006
	Penetration, in. per month		.....	.....	.....	.....	.....	.....
	Rating	Weight	5	5	1	4½	4	5
		Appearance	5	5	1	4½	3	5
		Overall	5	5	1	4½	3½	5
TRC Sample B	Weight in grams	Start	33.6425	34.0262	33.6123	33.6380	33.5103	34.2360
		Final	33.6426	34.0246	31.2023	33.6342	33.4941	34.2360
		Loss	0	0.0016	2.4100	0.0038	0.0162	0
	Penetration, in. per month		0	0	0.00283	4.5×10^{-6}	19×10^{-6}	0
	Rating	Weight	5	5	1	5	4	5
		Appearance	5	5	1	4	3	5
		Overall	5	5	1	4½	3½	5
430	Weight in grams	Start	22.3655	23.0118	21.6950	22.5445	22.7445	22.9560
		Final	22.3650	23.0118	19.5755	22.5426	22.7266	22.9552
		Loss	0.0013	0	2.1195	0.0019	0.0179	0.0008
	Penetration, in. per month		2.1×10^{-6}	0	0.0025	2.85×10^{-6}	21.5×10^{-6}	0
	Rating	Weight	5	5	1	5	4	4
		Appearance	5	5	1	5	3	5
		Overall	5	5	1	5	3½	5
301	Weight in grams	Start	18.1878	18.0015	17.4318	17.7020	18.0855	17.6444
		Final	18.1878	18.0015	17.3121	17.7016	18.0846	17.6444
		Loss	0	0	0.1197	0.0004	0.0009	0
	Penetration, in. per month		.....	.....	.....	.....	.....	.....
	Rating	Weight	5	5	2	5	5	5
		Appearance	5	5	2	5	5	5
		Overall	5	5	2	5	5	5

TABLE III

ANALYSES OF TEST SPECIMENS

	TRC			
	Sample A	Sample B	301	430
Chromium	16.38	15.23	17.40	16.50
Nickel	0.66	0.95	7.00	0.22
Manganese	15.80	17.59	1.36	0.47
Carbon	0.08	0.08	0.093	0.05
Phosphorous	0.014	0.022	0.025	0.015
Sulfur	0.010	0.008	0.012	0.0075
Silicon	0.40	0.38	0.58	.....
Nitrogen	.....	0.13	.....	.....

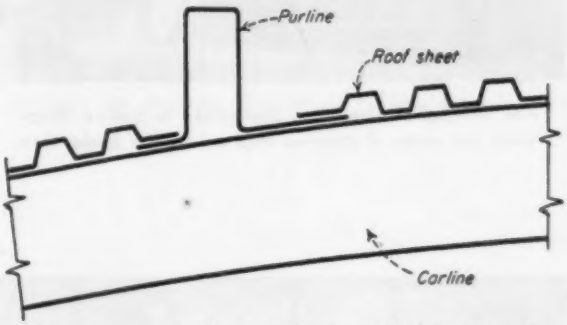


FIG. 3—Three stainless parts are welded into one in this roof assembly, typical of Shotwelding.

samples are placed next to each other. Budd claims there is more variation in color between different shipments of 301 than between 301 and TRC. Polished samples of the various grades however do show different types of luster.

The steel mills are having some difficulties in rolling this material—these stem from the 15 pct Cr and 0.10 pct C—but bugs are being eliminated.

Reason for the 0.10 pct C maximum is to prevent intergranular corrosion resulting from carbide precipitation.

Troubles are encountered in breaking down the TRC ingots into slabs. Slabs sometimes have ragged edges which force excessive discard. Some mills are experimenting with rare earth additions in an attempt to overcome this difficulty. Rolling beyond the slab stage presents no problems unusual to stainless steels in general. Budd reports average consistency in TRC with a normal rejection rate for stainless steels.

Tests in single Shotweld lap joints show TRC to have about 10 pct higher fatigue strength than 301 in the same section and condition. In single Shotweld U-form tension specimens, fatigue strength of the two are about equal.

Transverse bending fatigue tests of channel sections gave a slight but consistent edge to TRC over 301. Arc butt-welded specimens of TRC had 10 pct higher joint efficiency in tension than 301. The same samples tested under fatigue stressing did not show a significant difference in fatigue strength, though the 301 had a somewhat higher ultimate tensile strength.

Reason for the higher ultimate strength in the 301 is that TRC has a lower work hardening rate,

In general TRC was accepted as a full-fledged alternate for 301 in any structural application . . .

which could be valuable for some operations. For the same degree of cold reduction, yield strengths of TRC and 301 are equal but the ultimate strength of TRC is not as high.

Fatigue tests repeated on identical specimens after exposure to aerated 20 pct NaCl solution at 90°F for 7-day and 15-day periods showed no appreciable change in the performance of either TRC or 301.

In switching from one material to the other, the characteristics of TRC have been carefully weighed in comparison with 301. In general, the Budd Co. has accepted TRC as a full-fledged alternate for 301 in any structural application. When 301 becomes available again, Budd's choice of stainless steel will depend on factors other than physical and chemical characteristics.

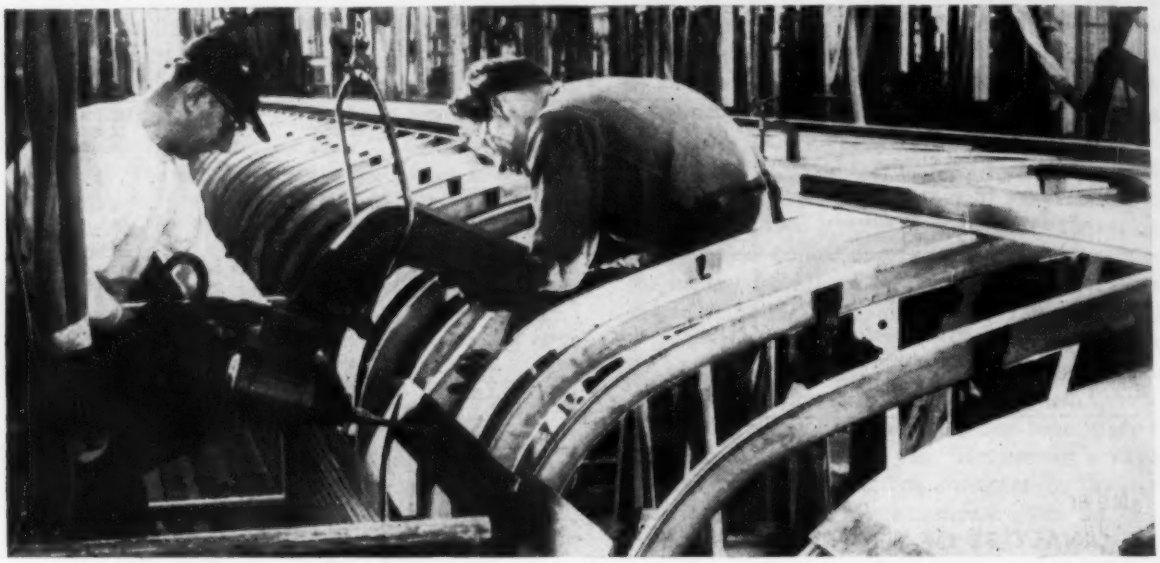


FIG. 4—Roof section being Shotwelded to carline. Structurals are made of stainless strip on a press brake, then curved if necessary on a stretch former. Closely controlled resistance weld is made with high current for brief period.

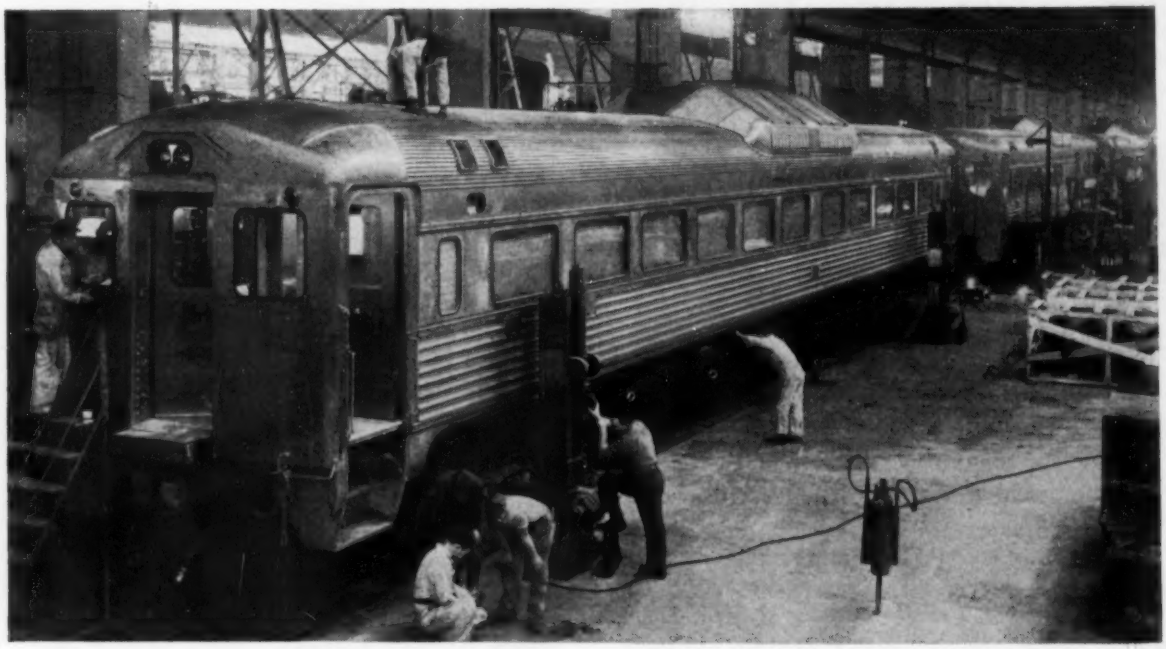
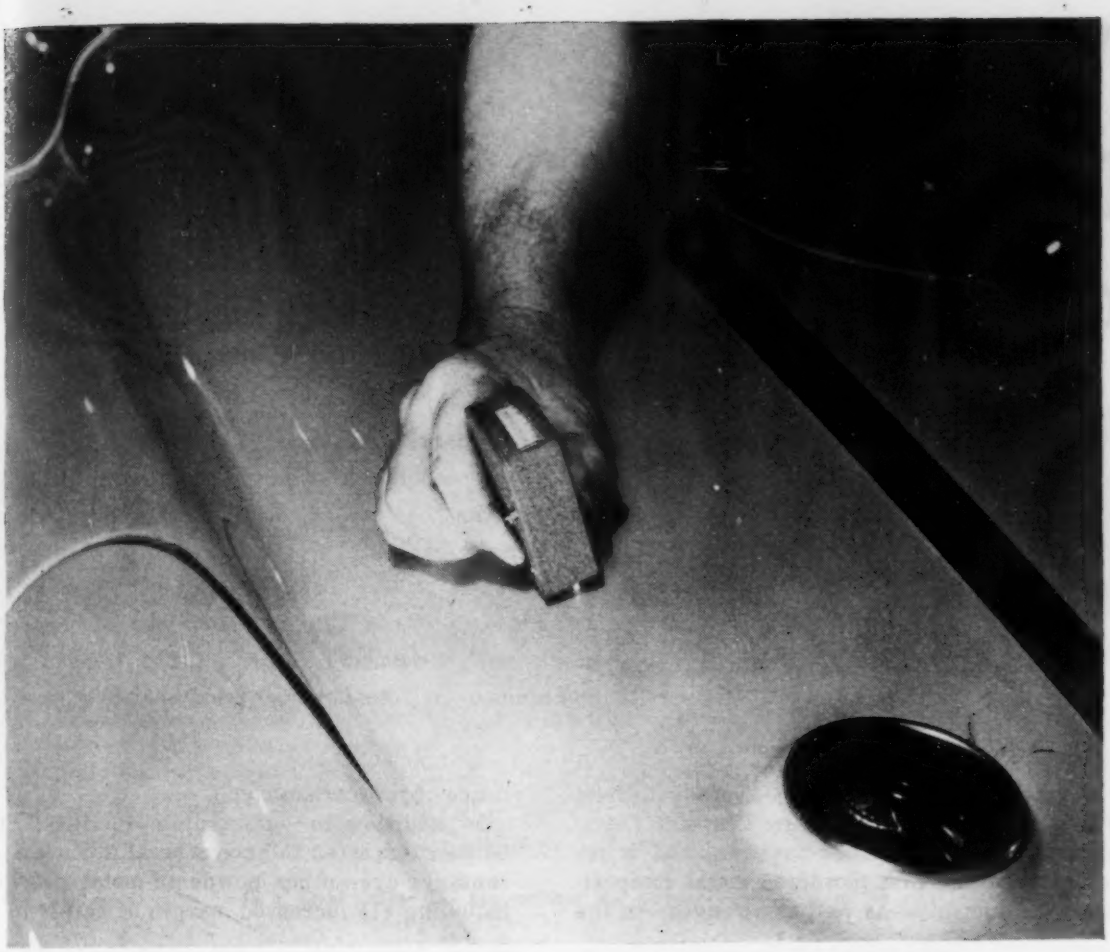


FIG. 5—Nearly complete Rail Diesel Cars on Budd assembly line. These all-stainless cars each contain 27,000 lb of TRC steel. Budd has used nearly 500 tons of TRC. No change in tool life is apparent.



TINY ELECTRO-MAGNETIC instrument is used by Pontiac to check the thickness of paint on 10 cars every hour.

Hand Gage Accurately Measures Paint Coat Thickness

◆ PAINT THICKNESS IS BEING MEASURED quickly and accurately with an instrument no bigger than the palm of a man's hand. The instrument is used to check the depth of the paint coating on 10 cars every hour on the 1953 Pontiac assembly line.

Accurate measurements within 0.0003 in. are made at any location on a flat or curved surface of the car where the thickness of the metal remains constant. Checks with a micrometer show the readings to be accurate and reliable.

Calibration is simple. First the instrument is set for the thickness of the bare metal. This setting is adjusted to take into account the paint thickness that will be added. (Most of the auto plants use a minimum of three coats of paint over a primer.) The instruments are recalibrated every 24 to 48 hr.

The instrument works on the principle of measuring the flow of current through the circuit that is completed when the two small, round feet on the bottom of the instrument are brought into contact with the painted metal surface.

There is no maintenance expense on instruments of this type which are coming into greater use in many U. S. manufacturing plants, including particularly the automotive and appliance industries. Several instruments of this kind are now on the market. Cost is in the range of $60.

A better steel powder—

DUCTILITY of Metal-Powder Parts Increased

By W. G. Patton
Asst. Technical Editor

◆ Steel-powdered parts equal in strength and ductility of wrought low-carbon steel have been made. . . . Steel powders can be alloyed, heat treated or surface hardened.

◆ Ductility of 2½ to 3 times better than other steel-powder parts is claimed. . . . Hardnesses up to RC 60 can be obtained. . . . These powder parts are easily staked.

◆ A NEW POWDERED-METAL product, Steel Oilite, has been announced by Chrysler Corp., Amplex Div. This ferrous-base material is reported to be the first powdered metal composition with ductility—as well as strength—in the range of low carbon steel.

In addition to outstanding ductility, Steel Oilite is expected to have several important advantages over other powdered-metal products, including (1) increased margin of safety in de-

FIG. 1—Steel Oilite, a new powdered metal product made by Chrysler's Amplex Div., has outstanding ductility.

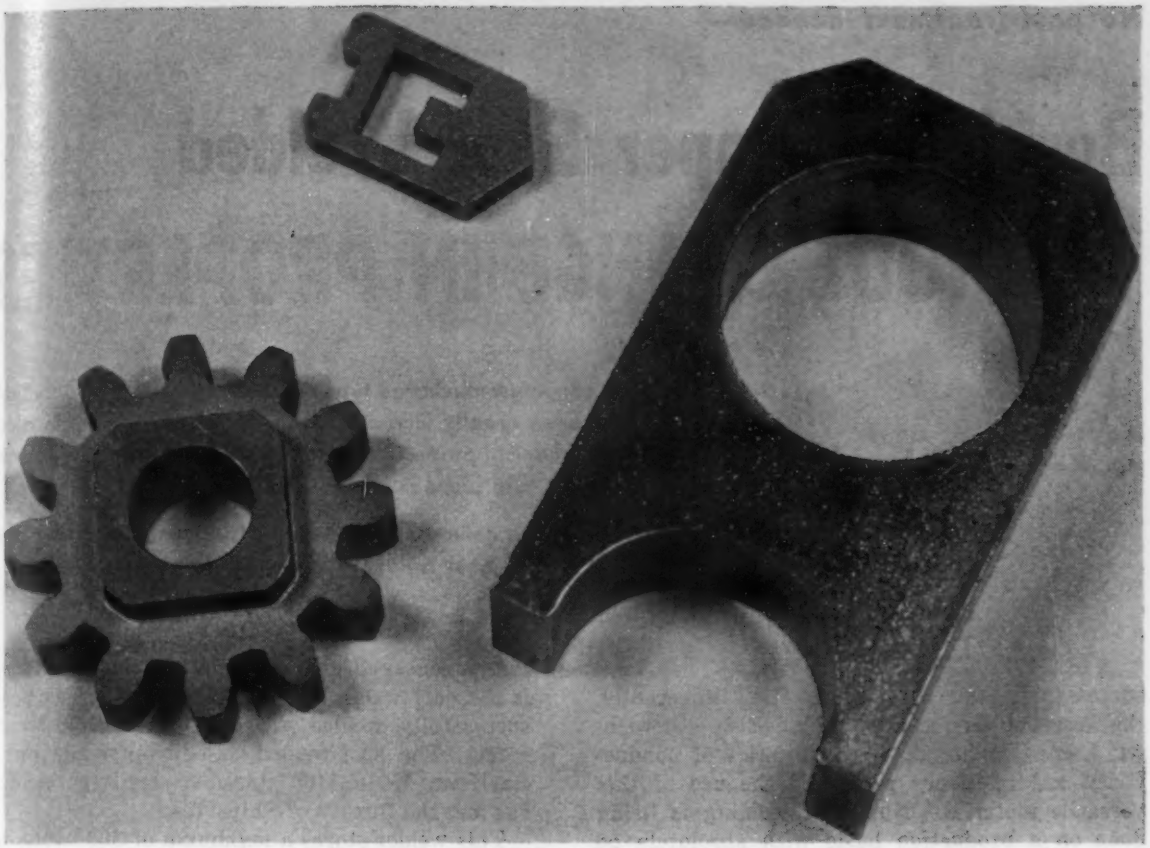


FIG. 2—Typical parts made of Steel Oilite. The new material has forming qualities equal to other metal powders.

sign, (2) greater ability to withstand impact and bending, (3) increased ability to take temporary overloads, (4) greater range of applications.

Fig. 1 shows a workman pounding a Steel Oilite gear with a ball-peen hammer. If desired, the material can be hardened by heat treatment, including carburizing, cyaniding or nitriding. Alloyed powders may also be used, if desired, to increase tensile strength. The press-formed and sintered-powdered metal product can also be infiltrated with copper. Most applications will require neither heat treatment nor alloy additions.

Typical uses for Steel Oilite include industrial machinery, automotive parts, home appliances, farm machinery, textile machinery, business machines and washing machines. Several parts made at Detroit are shown in Fig. 2.

The ductility of Steel Oilite is 2½ to 3 times greater than other iron powder products. The best ductility obtained on regular steel-powder parts is 2 pct elongation in 1 in. Steel Oilite ductility ranges from 5 to 30 pct elongation in 1 in.

Steel Oilite parts are now being produced in quantity at Detroit. Where the customer requires a heat-treated part, heating and quenching facilities are available at the Detroit plant.

Tensile strength of this new, highly ductile, low-carbon powdered material is in the same range as low-carbon steel bars. Fig. 3, showing the results of a torsional test, illustrates the unusual ductility of the new material.

Using carefully selected heat treatment, hardnesses up to 60 RC are available, although at some sacrifice in ductility as compared with non-heat-treated, low-carbon materials.

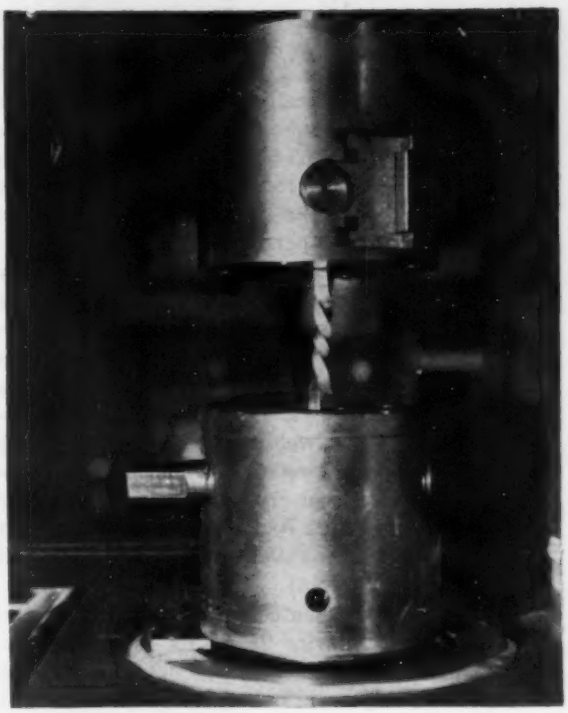


FIG. 3—Unusual ductility is demonstrated by the new Amplex powdered metal in this typical torsion test.

No post-treatment needed—

Beryllium Copper Spot Welded WITHOUT CHANGE IN PROPERTIES

By D. I. Brown
Technical Editor

◆ By using condenser-discharge type of welder the utility of Beryllium copper has been greatly increased . . . The usual changes in electrical and mechanical properties of the alloy when welded by former methods do not take place in this new method.

◆ No excess heat is generated . . . Welding is done in a fraction of a second . . . Welds meet rigid military specifications.

◆ A BERYLLIUM-COPPER ALLOY has been successfully resistance welded. Until recently, the fact that the metal could not be welded without loss of its major characteristics of conductivity and resiliency restricted the use of this versatile material. Now that welding is being done on a production basis with absolutely no change in those two properties, the potential uses of beryllium copper are greatly increased.

The welding of Berylco 25 would probably still be an enigma if military specifications had not called for the metal on one of its microwave applications. In this application, a metal of high conductivity and good spring properties is necessary. Beryllium copper was selected. Although beryllium alloys can be soft-soldered, the clamping springs could not be so made as the stress on the beryllium clamps was greater than the strength of the solder. The small spring clamps could not be riveted in this application as any projections on the inside of the 65-35 bronze tubes to which the springs are attached would influence the microwaves. Also the conductivity across the joint had to be near perfect.

The only method of attaching the clamps was by welding. A strong joint was mandatory as the vibration and shock specifications for the completed assembly are rigid. Fusion welding was out of the question as the mechanical properties of the beryllium alloy are obtained by heat treating at 600°F. Any welding heat for any length of time would thus destroy the mechanical properties. The electrical characteristics also suffer so that the weld area had to be very small with little or no excess heat over and above that needed to effect a strong joint.

Raytheon experimented with spotwelding the small strips of Berylco 25 on its condenser-discharge welders. A practice was developed in the Raytheon Weldpower Laboratories that proved successful and was put into production at Whiting & Davis Co., Plainville, Mass. As far as is known, the condenser-discharge welder made by Raytheon is the only welder on which Berylco 25 has been successfully welded without postwelding treatment. The spot-welded assemblies made on a Raytheon Model-1100 stored-energy type welder has met the Bureau of Ships' tests.

This welder stores a maximum of 3000 volts in a bank of condensers and is then discharged through a transformer and then to the electrodes in a fraction of a second. The electrodes used are RWMA type Class 2. When the welder is set at top output, the current at the electrode tips is 23,000 amps. at 10 v. No excessive heat is generated, and the weld is finished in 0.018 sec. An air cylinder provides the hold-down pressure, which ranges up to a maximum of 540 lb thrust.

The Berylco 25 spring-clamps used on the microwave assembly are shown in Fig. 1. The long strips and the curved-type pieces fit around the iris opening. The long pieces are 0.004 in. thick, while the curved strips are 0.008 in. thick. The iris strips are attached as shown in Figs. 2 and 3. The welder is set to store 2600 v at 240 microfarads; the hold-down pressure is 171 lb. This delivers a current across the electrodes of 18,000 amps, 12 v, and one spot is made every 2 or 3 sec.

The electrode on condenser-discharge welders is not water-cooled. The top electrode has a 5/32 in. diam head with a 3 in. radius tip curvature. The tip is polished to a 4 microinch finish. Bottom electrodes differ for each of the different types of spring clamps.

The circular clamp called a Magnatron strip is made of 0.015 in. thick Berylco 25. Like all the other pieces, the alloy is furnished in the full hard state. The same top electrode is used as can be seen in Fig. 4. For this welding, the machine setting is the same as that used on the iris clamps. Four spots are made 90° apart. A schematic of this joint is shown in Fig. 5. The joint is later soft-soldered around the inside diam-

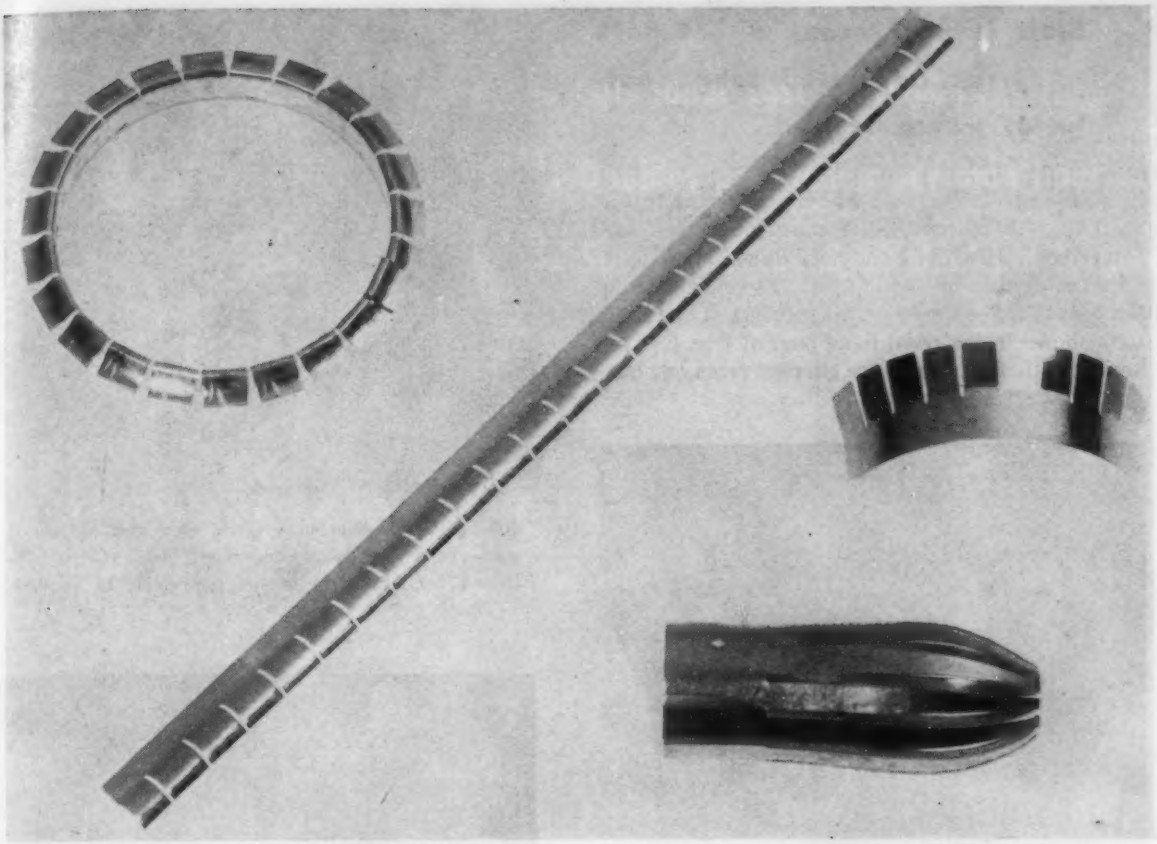


FIG. 1—These four types of Berylco 25 parts are spot welded to 65-35 bronze. The parts serve as spring clamps through which current travels in a microwave guide. Contact must be positive at all times.

FIG. 2—Berylco spring clamp for the end of the iris opening is welded using a stored energy of 2600 v at 240 microfarads. Two are used on each assembly.

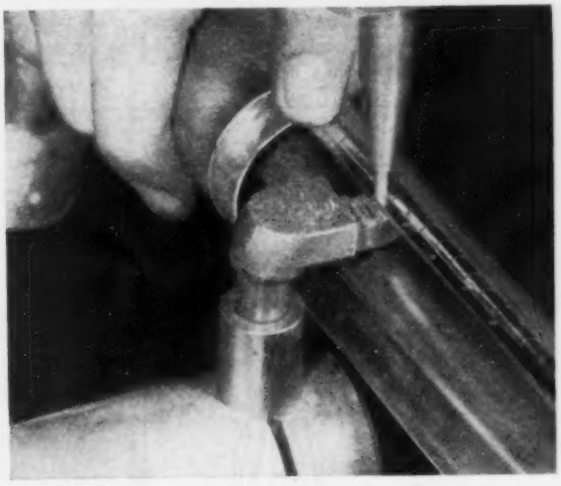


FIG. 3—Side clamps of iris opening are 0.004 in. thick. Current across the uncooled electrode is 18,000 amps at 12 v. One spot is made every 2 or 3 sec.

eter, but no solder is permitted on the spring fingers.

The five components which make up the part called a bullet contact are shown in Fig. 6. This stock is 0.025 in. thick. A hold-down pressure of 198 lb is used, and the machine is set to store 3000 v. Upon discharge, 23,000 amps at 12 v are delivered to the electrode tips. The entire bullet assembly is later given a bright coat on top of a copper-flash coat.

This particular part caused the worst headache

Slots in part break direct path of current and permit sound spot-welds where desired . . .

in welding. The current had the tendency to follow the path of least resistance and passed circumferencially around the beryllium-copper part. This resulted in no weld at all. To preclude this, the beryllium-copper part was designed with the slots shown in the right hand part of Fig. 6. This broke the direct path of the current from one button to the next and permitted sound spotwelds where desired. One spotweld is made between each slot as shown in Fig. 7.

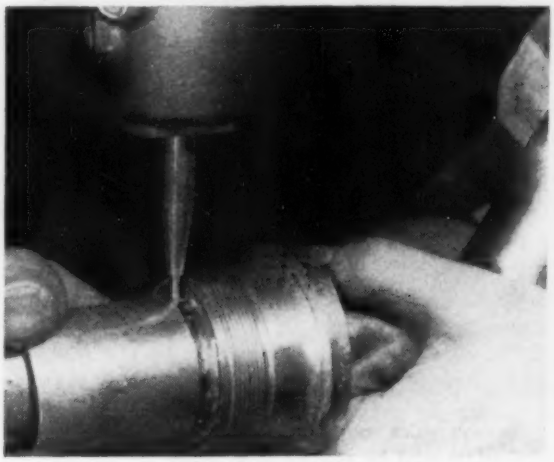


FIG. 4—Magnatron circular spring clamp 0.015 in. thick is tacked at four places 90° apart. This joint is later soft-soldered around the tube but no solder is permitted on the spring fingers.

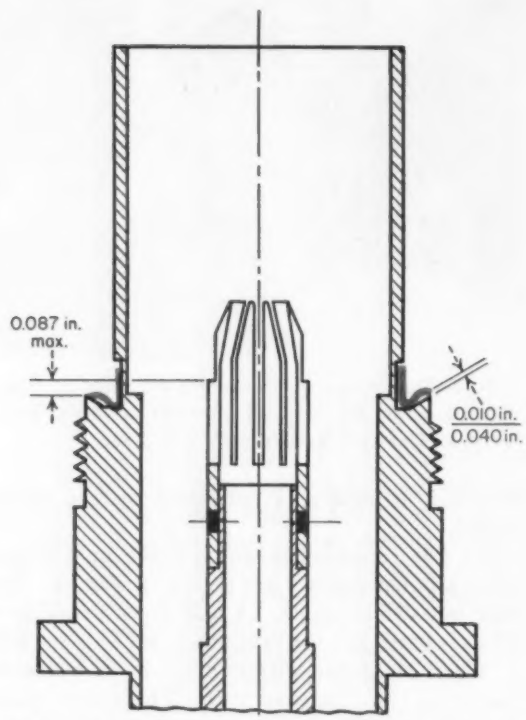


FIG. 5—Cross section of Magnatron clamp assembly shows the beryllium spring in color. Close tolerances must be held in this assembly.

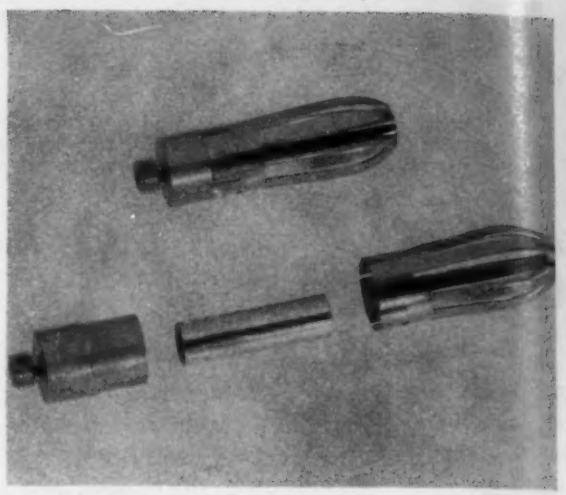


FIG. 6—Completed bullet spring clamp at the top is made from the three components shown below. The formed beryllium strip at the right is 0.025 in. thick.

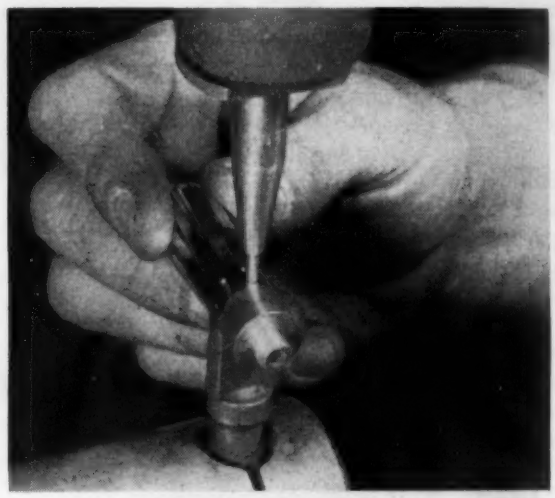


FIG. 7—A hold down pressure of 198 lb is used in welding the bullet assembly. The slots are necesary to effect a weld. Without the slots no weld can be made as the current merely travels around the periphery.

The 5/32-in. diam weld buttons are spaced at approximately ⅝-in. centers on the iris strips and on approximately ½-in. centers on the bullet assembly.

The Berylco 25 alloy is delivered to Whiting & Davis in the heat-treated condition and is completely fabricated. The dark-black scale is removed in a bright dip composed of nitric, sulphuric, and hydrochloric acids.

Due to the toxic effect of the alloy, it was found that the welding fumes which are hardly visible, nevertheless present, must be taken away from the operator. A simple exhaust system completely removes any harmful toxic gases generated in welding.

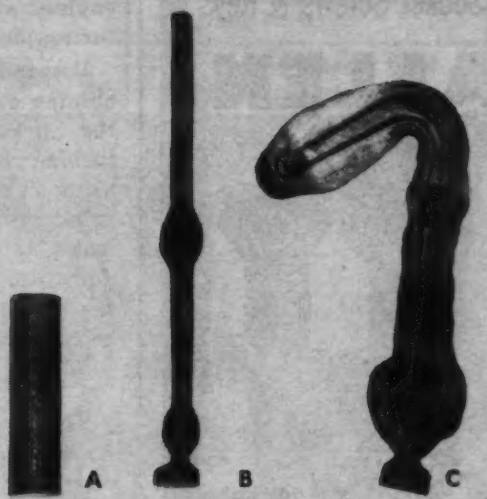
REDUCEROLLING THIS BELL CRANK FORGING BLANK—

1. Cuts labor cost in half . . .

2. Doubles production per man hour . . .

3. Saves one pound of steel per forging!

NO. 6 REDUCEROLL



Stock (A) measures 2¼" round by 8¾" long, weighs 10 lbs. REDUCEROLLED blank (B) ready for forging. Finished forging (C). Note small amount of flash.

METHOD	EQUIPMENT	CREW	FORGINGS PER 8 HOURS
OLD	Two Hammers	4 Men	575
NEW	One Hammer One Reduceroll	3 Men	900
RESULTS	Saves One Hammer	Saves One Man	Produces 325 More Forgings

From one of America's largest and most modern forge shops comes this report of outstanding progress in forging the steering bell crank illustrated above.

The REDUCEROLLING technique, in addition to producing 325 more forgings per eight hours, also obtains three extra forgings from each bar of stock, thus saving one pound of steel per forging. Rolls were redressed after pre-forming approximately 14,000 blanks. Same rolls have been redressed three times to date.

THIS DOOR IS ALWAYS OPEN!

Our entire organization is always at your service to help you solve your forging problems. Send us prints or samples of the parts you wish to forge. Better yet, visit us. No obligation, of course.

NATIONAL
MACHINERY COMPANY
TIFFIN, OHIO—SINCE 1874

DESIGNERS AND BUILDERS OF MODERN FORGING MACHINES • MAXIPRESSES • REDUCEROLLS • COLD HEADERS • BOLTMAKERS • NUT FORMERS • TAPPERS • NAILMAKERS

Hartford Detroit Chicago

Technical Briefs

Engineering

TURBINE WHEELS:

Special grinding, cutting equipment speeds blade output.

Use of an "automatic" surface grinder and special cutting equipment have helped speed production of turbine wheels for jet engines at one midwest manufacturing plant.

Demand for high precision machining of the blade assemblies—the buckets which mount in the turbine wheel—has been met by using a grinder arranged for crush grinding and equipped for automatic table skip and automatic downfeed. These features permit the difficult precision grinding to be handled on a production basis.

Trimming Problem

The problem of trimming the bucket-equipped wheel to the true circumference and desired diameter within close tolerances was met by using a band machine with special circle-cutting fixture.

The spline section or "root" of the bucket, now being machined on the grinders, presents a serious production problem because of the precision relationships which must be maintained between the root and blade section. Great accuracy is required since buckets must operate efficiently in a turbine wheel revolving at extremely high speeds and at very high temperatures.

TURBINE BLADES are trimmed to proper circumference on Contour-matic band machine equipped with motor driven fixture.

Five Surfaces Ground

Five root surfaces are ground in each bucket. This includes both spline surfaces, both root ends and a flat where the root joins the blade. All five surfaces are form or flat ground on the same crush grinder. Up to five buckets are handled at one time. Each bucket-fixture can be rotated to expose each root surface to the grinding wheel.

With the crush grinding method, deeper cuts are taken but the table must move at a comparatively slow rate during actual cutting. The automatic table skip feature permits the table to move rapidly when the wheel is "grinding air" in the spaces between the fixtures.

Skip feed trip dogs and a hydraulic control valve, accomplish this. Points at which the table skips are adjustable since the positions of the trip dogs in the table slot are adjustable.

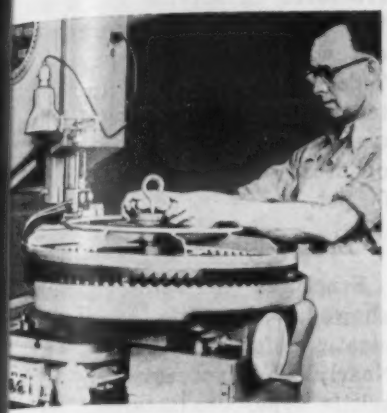
Automatic Cycle

With bucket jigs in proper position, the wheel is set manually to the proper starting level, the downfeed increment is set 0.0005 to 0.080 in., a downfeed limit switch is adjusted and the cycle started.

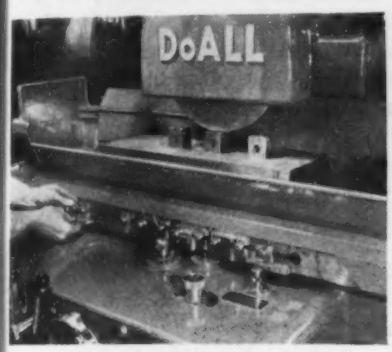
The table makes one cycle (a slow feed stroke and fast return to starting position) and stops. The grinding wheel moves down the distance determined by the set increment and the table makes another cycle. Alternate cycling and downfeed occurs until the

IF YOU WANT MORE DATA

You may secure additional information on any item briefed in this section by using the reply card on page 101. Just indicate the page on which it appears. Be sure to note exactly the information wanted.



GROUND BUCKETS are slipped into slots on the turbine wheel and cut along dotted line. Turbine wheel fits in special fixture.



SKIP FEED valve and trip dogs permit grinder to move faster when wheel is between work. Depression of button by skip dog causes table to move faster.

downfeed limit switch is actuated. Finish cuts can then be made directly under the control of the operator.

Cutting Fixture

A DoAll Contour-matic band machine equipped with a special cutting fixture is used to cut the circumference on the bucket-equipped turbine wheel.

When the roots of the buckets have been ground to within the required tolerances on the surface grinder, they are slipped into the spline slots on the turbine wheel. The bucket-equipped wheel is then placed in the fixture shown in the illustration and the ends of the bucket blades are sawed as the wheel revolves. Positioning of the fixture is accomplished manually with lead-screw-crank arrangements to control forward, backward and elevation movements.

Turn Page

WELD FRACTURES:

NBS study on welded ship break-up shows way to better design.

Improved welded ship and structure design have resulted from studies of the causes of welded ship hull breakup made by the Metallurgy and Mechanics Div. of the National Bureau of Standards. The study was started in 1943 at the request of the Navy.

Failures in welded ships have cost the nation almost $50 million in the past 9 years. At least 10 tankers and 3 Liberty ships have broken completely in two as a result of fractures which originated at some point in the hull structure. About 25 other vessels have suffered complete fractures of the strength deck or the bottom plate.

Across Welds

Although fractures also occur in riveted ships and structures, these fractures usually end at the first joint and do not propagate into adjoining plates. In a welded structure, however, a crack may propagate across the welds from one plate to the next, resulting in a complete structural failure.

Samples of fractured plates were supplied by the Coast Guard. Samples from nearly 100 ships in which fractures have occurred were studied. Tests have been completed on 126 plates selected from 65 of these ships.

Laboratory investigation included examination of the fracture and of welds, microscopic examination, chemical analyses of the plates, Charpy V-notched bar tests over a range of temperatures, and tension tests.

All Factors Considered

Data on the circumstances of the casualties, structural features of the ships involved and location and extent of the fractures were also studied.

Tensile tests were begun in 1947 on large specimens representing some of the hull structural details in which fractures had originated. These tests sought to determine the relative worth of certain structural details in service.

Tension tests showed plates fractured in service would meet the specification requirements under which they were purchased. This type of steel, in the usual tensile test, elongates under load more than 20 pct in 8 in. Reduction of cross-sectional area is about 50 pct.

Brittle Plastic Deformation

Fractures in ships, however, showed very little evidence of plastic deformation, or ductility. Nearly all fractures were of a brittle type, characterized by a break nearly perpendicular to the plate surfaces and a coarse granular appearance.

Reduction of thickness at the fracture edge was usually less than 2 or 3 pct, and the paint or scale on the plate surfaces was not cracked, even very near the fracture. This showed the fractures had propagated with very little plastic deformation of the steel.

Breaks Traced

Lack of ductility and the brittle nature of these fractures indicated that when the steel was incorporated in the structure of the ship, the mechanism of fracture, or the mechanical properties of the steel, were not the same as when determined by the usual tensile test using relatively small specimens.

Herringbone markings or chevrons in the fracture were found to be characteristic of the brittle type fractures in most of the ship plates examined. Also, the chevrons always point back toward the origin of the fracture.

A number of fractures examined had started in the shell plate at the end of a longitudinal stiffener, within a few inches of a transverse bulkhead. The longitudinal, welded to a shell plating, is interrupted for 6 in. for insertion of the transverse bulkhead. The stiffener is connected to the bulkhead by gusset plates.

Failure Cause

This structural notch at the abrupt end of the longitudinal stiffener was responsible for a

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— A —

ABRASION RESISTING STEEL OR "A-R STEEL"

An intermediate carbon manganese steel with better workability than carbon steel of the same hardness level.

ACETYLENE WELDING

Welding by using the acetylene torch for fusing a selected metal (welding rod) in such a position as to fill up the space where a junction is to be made. See Welding.

ACID STEEL

Steel made in a furnace or converter lined with siliceous (acid) refractory material. In the open hearth and electric furnaces employing the acid process, the hearth or bottom consists of fritted ("burned in") silica sand. The acid bessemer converter usually is lined with a kind of sandstone called "firestone." Raw materials for acid steel must be low in phosphorus and sulfur.*

ADDITIONS

Materials which are added to the molten bath of steel or to the molten steel in the ladle to produce the chemical composition required for the specific steel order.

AGING

The process by which steel changes in mechanical properties on long standing at ordinary room temperatures. Aging may change impact value, tensile strength, yield point, and behavior in certain forming operations.

AGE HARDENING

A process of aging that increases hardness and strength and ordinarily decreases ductility. Age hardening usually follows rapid cooling or cold working.*

AIRCRAFT QUALITY

Denotes material for important or highly stressed parts of aircraft and for other similar purposes; such materials are of extremely high quality requiring closely controlled, restrictive and special practices in their manufacture.

ALLIGATOR SHEAR

Heavy shears for cutting steel, the blades of which act in a manner suggestive of the alligator's jaws.

ALLOY

A substance that has metallic properties and is composed of two or more chemical elements of which at least one is a metal.

ALLOY SCRAP

Scrap steel which contains one or more alloying metals, such as nickel, chromium, tungsten, molybdenum. Such scrap must be very carefully classified according to composition and kept separate from other kinds of scrap.

ALLOY STEEL

"Steel is classified as alloy when the maximum of the range given for the content of alloying elements exceeds one or more of the following: manganese, 1.65 pct; silicon, 0.60 pct; copper, 0.60 pct; or in which a definite range or a definite minimum quantity of any of the following elements is specified or required within the limits of the recognized field of constructional alloy steels: aluminum, boron, chromium up to 3.99 pct, cobalt, columbium, molybdenum, nickel, titanium, tungsten, vanadium, zirconium, or any other alloying element added to obtain a desired alloying effect."

ALLOYING ELEMENTS

Chemical elements added for improving the properties of the finished products. Chief alloying elements in medium alloy steels are: Nickel, chromium, manganese, molybdenum, vanadium, silicon, copper.

ALPHA IRON

The form of iron that is stable below Ac_3 (1670°F, e. g., the temperature at which a change in phase occurs). See also Austenite, Ferrite and Gamma Iron.*

ALUMINUM

A metallic chemical element. (1) In either the bessemer, openhearth or electric furnace processes it is used as a deoxidizer, by adding it to the molten steel either in the ladle or in the mold, to remove oxygen and thereby control, or entirely eliminate, the escape of gas (called "killing"). Aluminum may also be added for the control of grain size, and occasionally as an alloying element. (2) A light weight metal. It weighs 28 pct as much as carbon steel.

ANGLE

A very common structural or bar shape with two legs of equal or unequal length intersecting at 90°.

ANNEALING

A process involving heating and cooling, usually applied to induce softening. The term also refers to treatments intended to alter mechanical or physical properties, produce a definite microstructure, or remove gases.*

ANNEAL, DEOXIDIZING

A sub-critical anneal performed in an inert atmosphere in order to minimize oxidation, remove internal strains after cold reduction, decrease hardness and tensile strength and develop maximum ductility.

ARC WELDING

Welding accomplished by using an electric arc that may be formed between a metal or carbon electrode and the metal being welded; between two separate electrodes, as in atomic hydrogen welding; or between two separate pieces being welded, as in flash welding.

ARMOR PLATE

A protective plate used on battleships, tanks, airplanes, etc. These plates must be very hard, very tough, and thick enough for the protection required. Armor plate varies from ¼ to 18 in. in thickness.

ARTZ PRESS SHEETS

Special sheets used principally in the manufacture of body parts for school buses, ambulances, and funeral cars.

AUSTENITE

A solid solution formed when carbon and certain alloying elements dissolve in gamma iron. Gamma iron is formed when carbon or constructional alloy steel is heated above the so-called critical range, and the ferrite (alpha iron, with a body-centered crystal structure) is transformed to a face-centered crystal structure. Austenite does not exit in most ordinary steels at room temperature.*

AUSTENITIZING

The process of forming austenite by heating a ferrous alloy to temperatures in the transformation range (partial austenitizing) or above the transformation range (complete austenitizing.)*

AXLE SHAFT QUALITY

A quality of steel accepted by the AAR and the ASTM for the production of forged railroad car axles.

— B —

BALLISTIC TEST

A test in which a projectile is fired at an armor plate. The armor plate or the projectile (whichever one is being tested) must meet certain requirements.

BAR, HOT ROLLED

Produced from ingots, blooms or billets covering the following range: Rounds—⅜ to 8¼ in. incl. Squares—⅜ to 5½ in. Round cornerned squares—⅜ to 8 in. incl. Hexagons—¼ to 4 1/16 in. incl. Plates—13/64 (0.2031) in. and over in specified thicknesses and not over 6 in. specified width.

Standard and special shapes: Angles, channels, tees and zees, when their greatest cross-sectional dimension is under 3 in.. Ovals, half ovals and half rounds. Special shapes.

BAR SHEAR

A shear for cutting bars into lengths for shipping.

BASE BOX

A unit of measure peculiar to the tin plate industry. It corresponds to an area equivalent to 112 sheets of tin plate, 14 x 20 in. each; or, 31,360 sq in.; or, 217.78 sq ft.

BASIC BOTTOM AND LINING

In a melting furnace, the inner lining and bottom composed of either crushed burned dolomite, magnesite, magnesite bricks or basic slag. These materials have a basic reaction in the melting process.*

BASIC MATERIAL

A chemical expression meaning the opposite of acid. Basic and acid materials, when brought together so that they can react, neutralize each other, forming salts or slags. In such reactions, the base becomes the positive part of the salt and the acid the negative. Examples of basic materials; limestone (or lime, CaO), magnesite (MgO), dolomite (containing both GaO and MgO). Examples of acid materials; quartzite or silica (SiO_2) and the various clays, oxides of sulfur, etc. In metallurgy, the terms, "bases" and "acids," are applied to refractories, fluxes, and slags. Slags are said to be basic when the bases in them are greater than the acids; or to be acid when the acids in them are greater than the bases.

BASIC STEEL

Steel melted in a furnace that has a basic bottom and lining, and under a slag that is dominantly basic.*

BAUXITE

The principal ore of aluminum. About 4 lb are needed to produce 1 lb of aluminum. It is a constituent of nearly all earthy materials and is unavoidably present in most slags. Bauxite is also used in the manufacture of alumina refractories for withstanding extremely high temperatures.

BEAM

An important member of the structural steel family. There are three varieties—the standard H, I, and the wide flange used for the weight supporting purposes.

BEARING PILE

A wide flange section of column dimensions with flange width equal to the depth. There are four series of this section which range from 14 in. to 8 in. in depth by 2 in. increments.

BEARING QUALITY STEELS

Steels used for balls, rollers and races of anti-friction bearings. Great hardness and resistance to crushing are the chief requirements, which properties are obtained with carbon, chromium, and vanadium. Chief representatives are SAE 52100 and SAE 6195 steels.

BEND TESTS

Various tests used to determine the ductility of sheet or plate that is subjected to bending. These tests may include determination of the minimum radius or diameter required to make a satisfactory bend and the number of repeated bends that the material can withstand without failure when it is bent through a given angle and over a definite radius.*

BESSEMER PROCESS

A process for making steel by blowing air under pressure through molten pig iron contained in a suitable vessel, whereby a portion of the iron, most of the silicon and manganese and practically all the carbon are eliminated by oxidation. See Converter.

BILLET

A semi-finished piece of steel which has resulted from rolling an ingot or a bloom. It may be square, but is never more than twice as wide as thick. Its cross-sectional area is usually not more than 36 sq in.

BILLET SHEAR

A shear which cuts billets rolled from blooms into required lengths.

BLACKPLATE

Cold reduced sheet over 12 in. wide to less than 32 in., in gages 29 and lighter, in cut length or coils and within the uniform Classification of Flat Rolled Carbon Steel Products.

BLOOM

A semi-finished piece of steel, resulting from the rolling or forging of an ingot. A bloom is square or nor more than twice as wide as thick, and usually not less than 36 sq in. in cross-sectional area.

BLOOM SHEAR

A shear which cuts a rolled ingot into bloom lengths. It also cuts off the discard.

BLOWHOLE

An internal cavity in steel produced during the solidification of the metal by evolved gas which, in failing to escape, is held in pockets.

BLUE BRITTLENESS

Brittleness occurring in plain carbon steel when heated in the temperature range of 400° to 650°F, or when cold after being worked within this temperature range.

BLUED PLATE

Black plate the surface of which has been oxidized at a suitable temperature with steam or air to produce a blue color.

BOTTLE TOP MOLD

An ingot mold which has a narrow throat at the top into which a metal piece, called a cap, is placed after the mold has been filled with molten steel. This mold is used when capped steel is made.

BOX ANNEALING

A process of annealing a ferrous alloy in a suitable closed metal container with or without packing material in order to minimize oxidation. The charge is usually heated slowly to a temperature below the transformation range, but sometimes above or within it, and is then cooled slowly. This process is also called "close annealing" or "pot annealing." See black annealing.*

BRANDING OF RAILS

The practice of recording in raised figures and letters on the side of rail: weight per lineal yard, designer of the section, maker of the rail, and year and month rolled.

BRAZING

Joining metals by fusion of nonferrous alloys that have melting points above 800°F but lower than those of the metals being joined. This may be accomplished by means of a torch (torch brazing), in a furnace (furnace brazing) or by dipping in a molten flux bath (dip or flux brazing). The filler metal is ordinarily in rod form in torch brazing; whereas in furnace and dip brazing the work material is first assembled and the filler metal may then be applied as wire, washers, clips, bands, or may be integrally bonded, as in brazing sheet.*

BREAKER BLOCK

A comparatively inexpensive part of a rolling mill or other machine which is designed to break when the machine is overloaded and thus save more expensive parts.

BRICK MARK

A defect occurring in some plates rolled from slabs to which a brick was stuck while it went into the mill. Loose bricks are used in some heating furnaces to support slabs so that the heating gases can circulate under, as well as over them. Occasionally, a brick sticks firmly to the slab.

BRIDGING

In a powder mass, the formation of arched cavities, which may result in voids or uneven density in a compact, or which may result in stopping or interrupting the flow of powder through a funnel or other feeding device.

BRIGHT ANNEALING

A process of annealing usually carried out in a controlled furnace atmosphere so that surface oxidation is reduced to a minimum and the surface remains relatively bright.*

BRITISH THERMAL UNIT (B. T. U. or Btu)

A unit of heat in the English System. One B.T.U. is the amount of heat required to raise the temperature of one pound of water one degree Fahrenheit.

BUILT-UP SECTIONS

Where the application calls for a beam of greater depth than produced by the mills, by using combinations of shapes and plates, suitable girders, can be fabricated.

BULB ANGLES

Simple angles with a bulb or bulge rolled at the toe of one leg. This structural shape is used principally in the railroad car and shipbuilding industries.

BUNDLE

A unit of specified weight or count, secured, then can be handled by hand.

BURLAPPING

Method of wrapping utilizing burlap cloth for protection against surface injury.

BURNT

A term applied to a metal permanently damaged by having been heated to a temperature close to the melting point.*

BUTT WELDING

Joining two edges or ends by placing one against the other and welding them.*

— C —

CAMBER

A bend in a plate or other product of a rolling mill which results because one edge or side is longer than the other. Camber in plates is often caused by rolls which are closer together at one end than at the other, or by uneven temperatures in the slab. In rails and structural shapes, the camber is the "up or down" curvature, as distinguished from the sidewise curvature or "sweep."

CAMBER OF ROLLS

The increased diameter at the middle of rolls, designed to counterbalance the bending of the rolls when they are subjected to high pressures during rolling.*

CAMBER OF SHEET

Curvature in the plane of rolled sheet or strip.*

CAPPED STEEL

Capped steel, a variation of rimmed steel, is cast in a bottle top mold. The cap, placed in the neck of the mold soon after the mold has been filled to the proper level, stops the rimming action before it is completed by cooling the top metal. The product is an ingot having a thin rim relatively free of blowholes and with less segregation than is usual for a rimmed ingot of the same volume.

CARBIDE

A compound of carbon with one or more metallic elements.*

CARBONITRIDING

A process in which a ferrous alloy is case-hardened by first being heated in a gaseous atmosphere of such composition that the alloy absorbs carbon and nitrogen simultaneously, and then being cooled at a rate that will produce desired properties.*

CARBOMETER

An instrument for rapid determination of the carbon content of steel, utilizing a specially cast sample.

CARBOMETER TEST

1. A sample of steel to be tested in a Carbometer. 2. A determination of the carbon content of a melt or heat of steel by means of a Carbometer.

CARBON STEEL

Steel which owes its properties chiefly to various percentages of carbon without substantial amounts of other alloying elements; also known as straight carbon steel, or plain carbon steel. Steel is classified as carbon steel when no minimum content of elements other than carbon is specified or required to obtain a desired alloying effect; when the specified minimum for copper does not exceed 0.40 pct; or the maximum content for the following does not exceed the percentages noted: Manganese, 1.65; silicon, 0.60; copper, 0.60.

CARBURIZING

To introduce carbon: (1) While steel is molten by adding carbonaceous material, coke, coal, electrode scrap, etc.; (2) while steel is in the solid state by heating it in contact with carbonaceous matter below its melting point.

CASE-HARDENING

A process of hardening a ferrous alloy so that the surface layer or case is made substantially harder than the interior or core. Typical case-hardening processes are carburizing and quenching, cyaniding, carbonitriding, nitriding, induction hardening and flame hardening.*

CAST IRON

The metallic product obtained by reducing iron ore with carbon at a temperature sufficiently high to render the metal uid and casting it in a mold.

CASTING

(1) A term applied to the act of pouring molten metal into a mold. (2) The metal object produced by such pouring.

CASTING STRAINS

Strains resulting from the cooling of a casting and accompanied by residual stresses.*

CAUSTIC DIP

Immersion of metal in a solution of sodium hydroxide to clean the surface, or, when working with aluminum alloys, to reveal the macrostructure.*

CEMENTATION

A process for obtaining a metal from a solution of one of its compounds through displacement by a more electropositive element. See electromotive series.*

CEMENTITE

A compound of iron and carbon known as "iron carbide," which has the approximate chemical formula Fe_3C and is characterized by an orthorhombic crystal structure.*

CHAIN STEELS

A high to medium carbon steel (1030) with basic requirements for uniformity of heat treating results, and good surface with freedom from seams. Chain steel is used (generally in cold rolled strip form) in the manufacture of small links for sprocket drives, etc.

CHANNELS

A common steel shape consisting of two parallel flanges at right angles to the web. It is produced both in bar sizes (less than 3 in.) and in structural sizes (3 in. and over).

CHARCOAL TINPLATE

Formerly, plates made from charcoal hearth wrought iron or from iron puddled from charcoal pig. At present the significance of the name has been lost, as the plate is now made of soft steel, the "Charcoal Plates" carrying a heavier coating of tin and thereafter of higher quality (and price) than "Coke" plates.

CHECK ANALYSIS

An analysis of the metal after it has been rolled or forged into semifinished or finished forms.

CHECKS

Defects in the form of cracks in the surface of ingots.

CHEMICAL REQUIREMENTS

When it is necessary to specify chemical composition, the requirements should be prepared on the basis of the standard limits and ranges shown in Table A, AISI III3, Part I together with the standard permissible variation for check analysis and standard methods of sampling.

CHIPPING

A method for removing seams and other surface defects with chisel or gouge so that such defects will not be worked into the finished product. Chipping is often employed also to remove metal that is excessive but not defective. Removal of defects by gas cutting is known as "deseaming" or "scarfing."*

CHLORINATION

(1) The roasting of prepared ore in contact with a chloride, usually common salt, to convert certain metals into the more easily separated chloride. (2) The degassing or purification of molted metals by fluxing with chlorine.

CHROME-CARBIDE PRECIPITATION

A chemical reaction sometimes occurring in chrome-nickel steel, in which the chromium, near the boundaries of the grains, flows to the boundaries and unites with carbon, thus forming the chrome carbides and depleting the chromium supply in the metal near the grain boundaries. This makes the steel susceptible to intergranular corrosion when brought into contact with various acids or alkalis.

CHROME PICKLE

A chemical treatment for magnesium in a nitric acid, sodium dichromate solution. The treatment gives some protection against corrosion by producing a film that is also a base for paint.*

CHROMIUM

An alloying element added to alloy steel (in amounts up to around 1.50 pct) to increase hardenability. Chromium content of 4 pct or more confers special ability to resist corrosion, so that steels containing more than 4 pct chromium are called "Stainless Steel."

CIRCLING

Cutting flat rolled products (sheet, plates, etc.) into circles or discs for customer uses.

CLOSE TOLERANCE

When required, hot-rolled material may be furnished to size tolerances more restrictive than standard, but in no case closer than ½ the standard variation. Material so specified is classed as close tolerance material.

CLOUDBURST TREATMENT

Surface hardening by the attack of steel balls.*

COATING

The process of covering steel with another material, primarily for corrosion resistance.

COBBLE

(1) A jamming of the line of steel sheet while being rolled. (2) A piece of steel which for any reason has become so bent or twisted that it must be withdrawn from the rolling operation and scrapped. Some reasons for cobbling are: Steel too cold, a bad end which can not enter a pass, sticking to the roll and wrapping around it, etc.

COKE TINPLATE

The most generally used hot dipped tinplate. Three typical classes of cokes are: (1) Cokes which have 1.25 or 1.5 lb of tin coating per base box pot yield, (2) best cokes, and (3) Kanners Special cokes. See Charcoal Tinplate.

COLD HEADING

Cold heading consists in forcing metal to flow cold into dies to form thicker sections and more or less intricate shapes. The operation is performed in specialized machines where the metal, in the form of wire or bar stock, may be upset or headed in certain sections to a larger size and, if desired, may be extruded in other sections to a smaller diameter than the stock wire. Although cold heading was developed for the production of bolts, screws, and rivets and is used largely for these parts, the process is applicable to a wide variety of special parts that have somewhat similar form.*

COLD HEADING QUALITY

Produced by closely controlled steelmaking practices including special melting, rolling, conditioning, inspection and testing, in order to be defect free and satisfactory for cold heading.

COLD PIG

Blast furnace metal which has been cast into solid pieces, usually weighing from 60 to 80 lb.

COLLED ROLLED PRODUCTS

Flat-rolled products which have been finished by rolling the piece without heating (at approximately room temperature).

COLLAR MARK

A defect on the surface of a rolled bar caused by excessive spreading against a collar of the roll.

COLUMBIUM

A metal which may be added to chrome-nickel stainless steel to improve its welding qualities, by preventing carbide precipitation.

COMPRESSIVE STRENGTH

Yield: The maximum stress that a metal, subjected to compression, can withstand without a predefined amount of deformation. Ultimate: The maximum stress that a brittle material can withstand without fracture when subjected to compression.*

CONDITIONING

The removal of surface defects (seams, laps, pits, etc.) from steel. Conditioning is usually done when the steel is in the semi-finished condition (blooms, billets, slabs). It may be accomplished, after an inspection, by chipping, scarfing, grinding, or machining. In special cases, the steel may be pickled first so as to reveal more of the defects.

CONTINUOUS MILL

A mill composed of several stands of rolls arranged "in tandem," usually so close together that the steel being rolled is passing through several stands simultaneously. Examples: bar mills, strip mills, and some recently constructed plate mills.

CONTROLLED COOLING

A process of cooling from an elevated temperature in a predetermined manner, to avoid hardening, cracking or internal damage, or to produce a desired microstructure. This cooling usually follows the final hot forming operation.*

CONVERTER

A vessel used for refining pig iron to make steel by the bessemer process. See Bessemer Process.*

COOLING STRESSES

Stresses developed by uneven contraction or external constraint of metal during cooling; also those stresses resulting from localized plastic deformation during cooling, and retained.*

COPPER STEEL

When any minimum copper content is specified, the steel is classed as copper steel. The copper is added to enhance corrosion resistance of the steel.

CORE

(1) A body of sand or other material placed in a mold to produce a cavity of desired shape in a casting. (2) A tubular defect that comes from the surface of a billet and appears at the back end of extruded rod. (3) The center or base portion of a clad product.*

CORE LOSS

That part of the electrical energy required to magnetize a core of magnetic material that is dissipated as heat generated within the core, as distinguished from the energy lost in the coil surrounding the core.

CORROSION

Gradual chemical or electrochemical attack on a metal by atmosphere, moisture or other agents.*

CORRUGATED SHEETS

Plain carbon or copper steel sheets uniformly crimped or corrugated for the length of the sheet and furnished either black or galvanized. The corrugations give the sheets structural strength and load-carrying ability. The main use is for exterior roofing, siding, culverts, etc.

CREEP

The flow or plastic deformation of metals held for long periods of time at stresses lower than the normal yield strength. The effect is particularly important if the temperature of stressing is in the vicinity of the recrystallization temperature of the metal.*

CREEP LIMIT

The maximum stress that will result in creep at a rate lower than an assigned rate.*

CRANE RAIL

A type of heavy tee rail having a shorter, thicker web and larger head than standard tee rail sections. They are generally used on crane runways and are designed to bear heavy concentrated loads.

CROP

The end or ends of an ingot or rolled product that contain the pipe or other defects to be cut off and discarded; also termed "crop end" and "discard."

CROPPING SHEAR

A shear which cuts off the parts which are to be discarded.

CROSS BREAKS

Slight reductions of thickness in narrow streaks across strip which has been coiled cold and uncoiled cold with extension of inside surface length beyond the elastic limit.

CROSS ROLLING

The rolling of sheet, plate or slabs so that the direction of rolling is changed 90 degrees from the direction of the previous rolling.

CROSS COUNTRY MILL

A mill composed of several stands which are arranged in train or in two or more trains so that the piece being rolled reverses direction of travel two or more times before the finish. The trains of rolls are set so far apart that the bar is engaged in only one stand at a time.

CROWN

Crown, in plates, sheet or strips, is characterized by a greater thickness in the middle than at the edges. It may be caused by a deflecting (bending) of the rolls or by worn rolls. This latter is sometimes called "hollowness of the mill."

CRUCIBLE

A ceramic pot or receptacle made of graphite and clay, or clay or other refractory material, used in the melting of metal.*

CRYSTALLIZATION

The formation of crystals by the atoms assuming definite positions in a crystal lattice. This is what happens when a liquid metal solidifies. (Fatigue, the failure of metals under repeated stresses, is sometimes falsely attributed to crystallization.)*

CUP FRACTURE

The type of fracture in which the exterior portion is extended and the interior is relatively depressed, resembling a cup. When only a part of the exterior is extended, the term 'half-cupped" or "quarter-cupped is used.

CUT LENGTH

All semi-finished material and all finished material not coiled is handled off the mill in cut lengths. This group includes bar shapes over 1-3/32 in., and sheets heavier than 10 gage.

CUTDOWNS

Applicable to electrical sheet products. Applies to sheet length: Shorter lengths than specified by customer; but reduction will be in multiples of buyer's lamination size, or of 12 in.

CYANIDING

A process of case hardening a ferrous alloy by heating in a molten cyanide, thus causing the alloy to absorb carbon and nitrogen simultaneously. Cyaniding is usually followed by quenching to produce a hard case.*

— D —

DECARBURIZATION

The loss of carbon from the surface of a ferrous alloy as a result of heating in a medium that reacts with the carbon.*

DEEP DRAWING

Forming shaped articles or shells by forcing sheet metal into a die.*

DEEP ETCHING

Macro-etching; etching, for examination at a low magnification in a reagent that attacks the metal to a much greater extent than normal for microscopic examination. Gross features may be developed: Abnormal grain size segregation, cracks or grain flow.*

DEFECT

A defect is anything that renders the steel unfit for the specific use for which it was ordered. What is defective steel for one customer may be "prime" steel for another customer.

DEOXIDIZE

In the limited sense used in metallurgy, the removing of oxygen from a batch of molten steel. Oxygen is present as iron oxide (FeO), which is dissolved in the steel, and is removed by adding a deoxidizing agent such as manganese, silicon, or aluminum.

DESCALING

The process of removing scale from the surface of steel. Scale forms most readily when the steel is hot by union of oxygen with iron. Common methods of descaling are: (1) crack the scale by use of roughened rolls and remove by a forceful water spray, (2) throw salt or wet sand or wet burlap on the steel just previous to its passage through the rolls.

DESEAMING

A surface conditioning which involves the removing of seams from steel. See chipping.

DISCARD

The top, piped portion of an ingot which has been sheared off and designated for remelting. A "cut" is usually taken from the bottom of the ingot as well.

DISCARDING

An act of rejecting undesirable portions of an ingot.

DRAFT

The amount by which a piece of metal being rolled is reduced in section is called the reduction or "draft."

DRAWING QUALITY

Flat-rolled products produced from either deep drawing rimmed steel or extra deep drawing aluminum killed steels. Special rolling and processing operations aid in producing a product which can stand extreme pressing, drawing, or forming, etc., without creating defects.

DROP FORGING

Forming metal, usually under impact, by compression within dies designed to produce the required shape. The term is ordinarily used synonymously with hot die forging.*

DROP HAMMER

A forging machine that employs the impact resulting from the action of gravity, with or without added steam or air pressure on a falling ram.*

DRY CYANIDING

Synonymous with carbonitriding.*

DUCTILITY

The property that permits permanent deformation before fracture by stress in tension.*

DUMMY

Stock that has been given a preliminary rough shaping before being placed between dies for drop forging complicated shapes.*

DUMMY BLOCK

A free cylinder that transmits pressure from the ram to the bullet in the extrusion of metals.*

— E —

EDGE

(1) To turn by 90° a piece of steel which is being rolled so it goes to the mill on its edge. (2) To roll a piece which has been so turned.

EDGE CONDITION

Mill edge is the normal edge produced in rolling, and does not conform to any definite contour. A *sheared edge* is one that has been cut after rolling. A *slit edge* results when a strip is cut into multiple widths by means of a rotary knife.

ELASTIC DEFORMATION

Temporary changes caused in dimensions by stress. The material returns to the original dimensions after removal of the stress.*

ELASTIC LIMIT

The maximum stress which a material is capable of sustaining without any measurable permanent extension remaining after complete release of the applied force.

ELECTRICAL SHEETS

Sheets manufactured from selected silicon steel alloys; having definite magnetic characteristics contributed largely by the silicon content; used mostly in the construction of electrical equipment. There are eleven commercial grades of electrical sheets.

ELEVATOR TEES

Special structural sections which are erected in elevator shafts to guide the elevator cages.

END HARDENING OF RAILS

Commonly, to heat the rail ends and to cool them at such a rate as to raise the hardness from 260 Bhn to 400 Bhn. This is done to minimize effects of end batter.

ENDURANCE

The ability of parts to withstand repeated reversals of stress. See Fatigue.

ENDURANCE LIMIT

The maximum stress that a metal will withstand without failure during a specified large number of cycles of stress. If the term is employed without qualification, the cycles of stress are usually such as to produce complete reversal of flexural stress.*

ETCHING

In metallography, the process of revealing structural details by the preferential attack of reagents on a metal surface.*

ETCH TESTS

Tests used to detect inclusions in steel. A common method of making the test is to dip the sample into acid which reacts with the inclusions and discloses their presence.

EXTENSOMETER

Device, usually mechanical, for indicating the deformation of metal while it is subjected to stress.*

EXTENSOMETER TEST

A test used to determine how much a given material may be extended without rupturing.

EXTRUSION

Shaping metal into a continuous form by forcing it through a die of appropriate shape.*

— *F* —

FABRICATOR, STEEL

One who forms, manufactures or builds. His operations are to punch, cut, shear, drill, bend, flange or weld plates and shapes.

FATIGUE

The tendency for a metal to break under conditions of repeated cyclic stressing considerably below the ultimate tensile strength.*

FATIGUE CRACK OR FAILURE

A fracture starting from a nucleus where there is an abnormal concentration of cyclic stress and propagating through the metal. The surface is smooth and frequently shows concentric (sea shell) markings with a nucleus as a center.*

FATIGUE LIMIT

The maximum stress that a metal will witrstand without failure for a specified large number of cycles of stress. Usually synonymous with endurance limit.*

FERRITE

A solid solution in which alpha iron is the solvent, and which is characterized by a body-centered cubic crystal structure. See also Austenite, Alpha Iron, Gamma Iron.*

FERROALLOY

An iron-bearing product, not within the range of those called steels, which contains a considerable amount of one or more alloying elements, such as manganese, silicon, phosphorus, vanadium, chromium. Some of the more common ones are ferrochromium, ferromanganese, ferrophosphorus, ferrosilicon, ferrovanadium. The chief use of these alloys is for making additions of their respective alloying elements to molten steel.

FERROCHROME

A finishing material which contains about 70 pct chromium. It is used when it is desired to add chromium to steel.

FERROMANGANESE

A product of the blast furnace, containing, besides iron, 78 to 82 pct of manganese and some silicon, phophorus, sulphur and carbon. It is used as a deoxidizer and for the introduction of manganese into steel.

FERROPHOSPHORUS

A finishing material (see "finishing") which contains about 18 pct phosphorus. It is used when it is necessary to add phosphorus to steel.

FERROSILICON

A product of the blast furnace which contains 8 to 15 pct silicon. It is used as a deoxidizer and for adding silicon to steel.

FERROUS METALLURGY

That section of general metallurgy which embraces the science and knowledge applying to iron and steel products, their preparation and adaptation to their numerous uses.

FERROVANADIUM

A product which contains iron and about 38 pct vanadium. Used as a finisher for adding vanadium to steel.

FILLET

A concave junction of two (usually perpendicular) surfaces.*

FIN

A defect extending from end to end of a bar or other rolled section caused by the spreading of the steel into the clearance of the rolls, thus producing a thin overfill. If rolled in another pass, a fin usually becomes a lap.

FINISH

In the steel industry, refers to the type of surface condition desired or existing in the finished product.

FINISHING

The act of dissolving materials in molten, purified metal for the purpose of changing its composition to that which is called for in the steel order. Also, the shaping-up of the melt without additions.

FINISHING MATERIALS

Any material which may be added to purified molten metal in the latter stages of producing a heat of steel; i. e., for modifying its chemical composition. See Additions.

FIREBOX QUALITY

Plates for pressure vessels which will be exposed to fire or heat where they are exposed to thermal and mechanical stresses.

FLAKES

Internal fissures in ferrous metals. In a fractured surface these fissures may appear as sizeable areas of silvery brightness and coarse texture, in wrought products such fissures may appear as short discontinuities on an etched section. Also called "shatter cracks," "chrome checks," "fish eyes" and "snowflakes."*

FLAME CUTTING

(1) Severing a piece of steel by burning a portion out by means of an oxyacetylene torch, or (2) removing a part of the surface by means of the burning torch, as in conditioning. (More properly called "scarfing".)

FLAME ANNEALING

A process of softening a metal by the application of heat from a high-temperature flame.*

FLAME HARDENING

A process of hardening a ferrous alloy by heating it above the transformation range by means of a high-temperature flame, and then cooling as required.*

FLANGE

(1) a projection of metal on formed objects. (2) The parts of a channel at right angles to the central section or web.*

FLANGE QUALITY

Plates intended for application in pressure vessels, not exposed to fire or radiant heat. Special manufacturing, testing and marking is required on this product.

FLASH

A thin fin of metal formed at the sides of a forging or weld when a small portion of metal is forced out between the edges of the forging or welding dies.*

FLASHING (ROOF)

Specially prepared sheet steel or other material used principally at the edges of roofs and around chimneys and vents to make the roof water tight.

FLAT SHEET

Sheet rolled as pieces of convenient size and then flattened or leveled, usually by stretching. This operation may produce properties slightly different from those of coiled sheet.*

FLATS

Flat bars. They include all rectangular bars, except squares 13/64 in. and over in specified thickness, not over 6 in. in specified width.

FLATTENING

Standard commercial flatness is obtained by roller leveling. This consists in passing sheets singly or in packs through a machine having a series of small diameter rolls.

FLOATING LOAD

A load carried on and attached to skids which are free to slide longitudinally under traffic shocks. Lateral movement is prevented by lumber fastened to the car floor.

FLOOR PLATES

Plates rolled with special projections or buttons on one surface to provide non-slip grip.

FLUTING

Kinking or breaking caused by the curving of metal strip on a radius so small, in relation to thickness, as to stretch the outer surface well beyond its elastic limit.*

FLYING SHEAR

A shear which severs steel as the piece continues to move. In continuous mills, the piece being rolled cannot be stopped for the shearing operation, so the shear knives must move with it until it is severed.

FORGING

(1) As a noun; a metal product which has been formed by hammering or pressing, (2) As a verb: Forming hot metal into the desired shape by means of hammering or pressing.

FORGING STRAINS

Differential strains that result from forging or from cooling from the forging temperature, and that are accompanied by residual stresses.*

FORGING QUALITY STEEL

A special grade of semi-finished steel in the form of blooms, billets, or slabs which is suitable for forging. It must be free of pipe and of excessive segregation, and must be free of injurious surface defects.

FORGING ROLLS

Rolling mills that forge comparatively uniform shapes by using variable radii around the circumference of rolls that rotate in the opposite direction from those ordinarily used for rolling.*

FORMING

To shape or fashion with the hand or tools or by a shape or mold.

FORMING PROPERTIES

Those physical and mechanical properties that allow a steel to be formed without injury to the steel in the finished product.

FOUR-HIGH MILL

A stand which has four rolls, one above the other. This kind of mill has two work rolls, each of which is stiffened by a larger back-roll. Four-high rolls are used only on mills which roll flat products: Slabs, plates, sheets and strips.

FRACTURE TEST

Breaking a piece of metal for the purpose of examining the fractured surface to determine the structure or carbon content of the metal or to detect the presence of internal defects.

FREE MACHINING

The property that makes machining easy because of the forming of small chips, a characteristic imparted to steel by sulfur.*

FREEZE

To congeal or solidify, e.g., when molten steel cools it changes from the liquid to the solid state. In similar fashion, water freezes if cooled below 32°F.

— G —

GAGES

A measurement of thickness. There are various standard gages such as United States Standard Gage (USS), Galvanized Sheet Gage (GSG), Birmingham Wire Gage (BWG).

GAMMA IRON

The form of iron stable between Ae_3 and Ae_4 (910 and 1400 C; 1670 and 2550F) and characterized by a face-centered cubic crystal structure.*

GAS CYANIDING

Synonymous with carbonitriding.*

GALVANIZING

The process of applying a coating of zinc to the finished cold-reduced sheet or to fabricated parts made from strip products. The coating is applied by hand dipping or electrolytic deposition.

GALVANNEALED

An extra tight coat of galvanizing metal (zinc) applied to a soft steel sheet, after which the sheet is passed through an oven at about 1200°F. The resulting coat is dull gray without spangle especially suited for subsequent painting.

GAS CUTTING

Cutting material with gas torch rather than by shearing. This operation may set up undesirable stresses in the material near the cut edges due to thermal effects; such stresses can be relieved by suitable heat treatment. Same as flame cutting.

G.E.O. PLATES

A special type of railroad tie plate which is attached to the wooden tie by means of heavy lag screws rather than spikes; has a rubber or wooden shim un-

der the rail; has a ridge on each side of the rail seat; has a special notch in each ridge fitted with a square headed bolt and spring washer to hold the rail in place. G.E.O. Plates are commonly used for all-welded tracked construction.

GRADE

The term grade designates divisions within different types based on carbon content or mechanical properties; for example, "This is a high tensile (grade) structural steel."

GRINDING

A method of conditioning steel which makes use of a power-driven grinding wheel.

GRIZZLY

A device consisting of approximately parallel bars used for the coarse separation or screening of ores.*

GROOVE

A depression encircling the body of a roll into which the piece being rolled is forced.

GUIDE

A part of a stand of rolls which steers the steel into the pass and supports it in the correct position. There are also delivery guides on some mills which strip the steel out of the grooves, thus assuring that it does not wind around a roll. Some continuous mills also have twisting guides.

GUIDE MARK

A defect on the surface of a bar caused by the rubbing of an improperly designed or improperly set guide.

GUILLOTINE SHEAR

A shear the upper knife or blade of which moves downward like the French guillotine, i.e., as a window sash moves down. It is sometimes called a gate shear.

— *H* —

H-STEELS

Alloy steels that can be used in applications requiring different degrees of hardenability.

HAMMER FORGING

A forging process in which the work is deformed by repeated blows. Compare with press forging.*

HAMMERING

Beating metal sheet into a desired shape either over a form or on a high-speed mechanical hammer, in which the sheet is moved between a small curved hammer and a similar anvil to produce the required dishing or thinning.*

HAMMER LAP

A defect on the surface of steel, being a folded-over portion produced by bad practice in forging.

HAMMER WELDING

Welding effected by heating close to their melting point the two surfaces to be joined, and hammering them until a firm union is made.

HARD DRAWN

A temper produced in wire, rod or tube by cold drawing.*

HARDENABILITY

In a ferrous alloy, the property that determines the depth and distribution of hardness induced by quenching.*

HARDNESS

Defined in terms of the method of measurement. (1) Usually the resistance to indentation. (2) Stiffness or temper of wrought products. (3) Machinability characteristics.*

HEARTH

In a reverberatory furnace, the portion that holds the molten metal or bath.*

HEAT

1. A form of energy which raises the temperature of bodies into which it is absorbed. 2. An individual bath of metal as it is treated in a furnace.

HEXAGONS

A product of hot rolled carbon steel bars hexagonal in cross section. Commercial size range of hexagons, ¼ to 5½ in. inclusive.

HIGH STRENGTH STEEL

Low alloy steels forming a specific class in which enhanced mechanical properties and, in most cases, good resistance to atmospheric corrosion are obtained by the incorporation of moderate proportions of one or more alloying elements other than carbon. The preferred terminology is now "high-strength, low-alloy steels".

HOLDING FURNACE

A small furnace for maintaining molten metal from a larger melting furnace, at the right casting temperature.*

HOMOGENEOUS

Usually defined as having identical characteristics throughout. However, physical homogeneity may require only an identity of lattice type throughout while chemical homogeneity requires uniform distribution of alloying elements.*

HOOP

Special quality flat rolled steel product developed to meet the requirements of the cooperage industry in the manufacture of barrels, pails and kegs. It is furnished in black or galvanized, in cut lengths or coils as specified.

HOT BED

A large area containing closely spaced rolls or rails for holding hot, partially rolled metal.*

HOT FORMING

Working operations such as bending and drawing sheet and plate, forging, pressing, and heading, performed on metal heated to temperatures above room temperature.*

HOT ROLLED

Hot rolled products are those products that are rolled to finish at temperatures above the recrystallization temperature.

HOT SHORTNESS

Brittleness in hot metal.*

HOT TOP

A reservoir insulated to retain heat and to hold excess molten metal on top of an ingot mold, in order to feed the shrinkage of the ingot. Also called "Shrink head," or "feeder head".*

HOT QUENCHING

A process of quenching in a medium at a temperature substantially higher than atmospheric temperature.*

HOT WORKING

Plastic deformation of metal at such a temperature and rate that strain hardening does not occur. The lower limit of temperature for this process is the recrystallization temperature.*

HYDRAULIC SHEAR

A shear driven by water or oil pressure.

— I —

IMMERSION COATING

Coating a metal with a second metal by immersing the first in a solution containing ions of the second.*

IMPACT EXTRUSION

A cold forming process in which the metal is forced by impact to flow around the punch, forming a tube with a solid bottom.*

IMPACT TEST

A test to determine the energy absorbed in fracturing a test bar at high velocity. The test may be in tension or in bending, or it may properly be a notch test if a notch is present, creating multiaxial stresses.*

INDENTATION HARDNESS

The resistance of a material to indentation. This is the usual type of hardness test, in which a pointed or rounded indenter is pressed into a surface under a substantially static load.*

INDIRECT EXTRUSION (INVERTED)

An extrusion process in which the metal is forced back inside a hollow ram that pushes the die.*

INDUCTION HARDENING

A process of hardening a ferrous alloy by heating it above the transformation range by means of electrical induction, and then cooling as required.*

INDUCTION HEATING

A process of heating by electrical induction.*

INITIAL CREEP

The early part of the time-elongation curve for creep, in which extension increases at a rapid rate.*

IN TANDEM

An arrangement of stands in a rolling mill, one after another, so that the piece being rolled can travel in one direction through a number of stands. Contrast with "in train". See Continuous Mill.

INCIDENTAL ELEMENTS

Elements commonly found in steel, not required or ordered to meet customer specifications.

INCLUSIONS

Particles of non-metallic impurities, usually oxides, sulphides, silicates, and such, which are mechanically held in steel during solidification.

INGOT

Steel formerly in a molten state, transferred to an ingot mold to solidify.

INGOT IRON

Steel so low in carbon, silicon, manganese, phosphorus, sulphur and other metalloid content that it is commonly called "pure iron". Ingot iron is sometimes used for making enameling sheets. Also, silicon is sometimes added to "pure iron" to make high grade electrical sheets.

INGOT MOLD

A mold in which ingots are cast. Molds may be circular, square, or rectangular in shape, with walls of various thickness. Some molds are of larger cross section at the bottom, others are larger at the top.

INTERANGULAR CORROSION

A type of electrochemical corrosion that progresses preferentially along the grain boundaries of an alloy, usually because the grain boundary regions contain material anodic to the central regions of the grain.*

INTERNAL SOUNDNESS

Refers to condition of inside of material—lack of defects, pipe, segregation, nonuniformity of composition.

IRON

Primarily the name of a metallic element. In the steel industry, iron is the name of the product of a blast furnace containing 92 to 94 pct iron. Other names for blast furnace iron are pig iron and hot metal.

IRON SCRAP

Blast furnace metal or other iron which may be salvaged by remelting in a blast furnace or in a steelmaking furnace.

IZOD TEST

A pendulum type of impact test, in which the specimen is supported at one end as a cantilever beam and the energy required to break off the free end is used as a measure of impact strength.*

— J-K —

JOINT BARS

Bars uniform section at right angles to the direction of rolling, weighing 60 lb per pair and heavier used for the purpose of securely joining two sections of rail.

JOMINY TEST

Hardenability test performed usually on alloy steels used to determine effects.

JOURNALS

(1) The portion of a rotating axle, shaft, spindle, or roll which turns in a bearing. (2) The neck of a roll.

KILLED STEEL

Steel deoxidized with a strong deoxidizing agent such as silicon or aluminum in order to reduce the oxygen content to a minimum so that no reaction occurs between carbon and oxygen during solidification.*

KIP

A load of 1000 lb, or 453.59 kg.*

— L —

LADLE

A large vessel into which molten metal or molten slag is received and handled. Molten metal may be transported short distances by carrying it in a ladle.

LADLE ANALYSIS

The term applied to the chemical analysis representative of a heat or blow of steel and is the analysis reported to the purchaser. It is determined by analyzing, (for such elements as have been specified) a test ingot sample obtained from the first part or middle part of the heat or blow during the pouring of the steel from a ladle.

LAMINATIONS

Defects resulting from the presence of blisters, seams or foreign inclusions aligned parallel to the worked surface of a metal.*

LAP

A surface defect appearing as a seam caused from folding over, during hot rolling, fins or sharp corners and then rolling or forging, but not welding, them into the surface.

LAP WELD

A term applied to a weld formed by lapping two pieces of metal and then pressing or hammering, and applied particularly to the longitudinal joint produced by a welding process for tubes or pipe, in which the edges of the skelp are beveled or scarfed so that when they are over-lapped they can be welded together.*

LEVELING

The flattening of steel plates and sheets. There are several methods, such as roller leveling and stretcher leveling.

LIGHT RAILS

Rails weighing 60 lb or less per lineal yard.

LIMING

Application of lime to pickled rod product in the wire industry for protection against corrosion and as a lubricant for cold drawing.

LIMITED DECARBURIZATION

Restricted decarburization. Decarburization limitations may be specified in special bar quality steels when maximum affected depth of surface decarburization is required for special applications.

LIQUATED SURFACE

A surface of an ingot that exhibits exudations or protuberances as a result of inverse segregation. See tin sweat.*

LONGITUDINAL DIRECTION

The direction in a wrought metal product parallel to the direction of working (drawing, extruding, rolling).*

LONG TERNES

Flat rolled steel in sheet sizes, coated with a mixture of lead and tin. Commonly from 80 pct lead and 20 pct tin to 85 pct lead and 15 pct tin, are used in the coating.

— M —

MACHINE STRAIGHTENING

The straightening of the material, which irregularities of the rolling and cooling often make necessary, is done in roll straighteners or machine straighteners, or by means of gag presses.

MACHINING

In general, the cutting away of the surface of a metal by means of power driven machinery. Specifically, a method of conditioning steel by machining away the surface. See Turning: Conditioning.

MACROETCH

A testing procedure for porosity, pipes, bursts, unsoundness, inclusions, segregations, carburization, flow lines from hot working, etc. Surface of the test piece should be reasonably smooth or even polished. After applying a suitable etching solution, the structure developed by the action of the reagent may be observed.

MACROGRAPH

A photographic reproduction of any object that has not been magnified more than ten times.*

MACROSCOPIC

Visible either with the naked eye or under low magnification (as great as about 10 diameters).*

MACROSCOPIC DEEP ETCH TEST

Referred to as the porosity test. The test piece is heavily etched in HCI at 180 degrees F and then closely examined under magnification for the detection of hammer bursts, pipe, seams, laps, checks, flakes. A light etch is employed to detect soft spots, depth of case, etc.

MAGNAFLUX TEST

An inspection given to important or highly stressed parts of aircraft quality steel using alloy. It consists in suitably magnetizing the material and applying a prepared magnetic powder which adheres to it along lines of flux leakage. It shows the existence of surface and subsurface nonuniformities.

MAGNETIC TESTING

Or the Magnaflux method of testing for determining internal defects, which is carried out by magnetizing the bar and sprinkling it with a magnetic powder which has been applied to detect flaws or defects on the surface.

MALLEABILITY

The property that determines the ease of deforming a metal when the metal is subjected to rolling or hammering. The more malleable metals can be hammered or rolled into thin sheet more easily than others.*

MANDREL

(1) A rod used to retain the cavity in hollow metal products during working. (2) A metal bar around which other metal may be cast, bent, formed or shaped.*

MANGANESE-NICKEL-COPPER

An obsolete high-strength low-alloy steel, intended primarily for weight reduction by means of high strength, greater toughness and improved welding characteristics in applications requiring cold forming and moderately severe impacts in low temperature service.

MARINE QUALITY

Plates for pressure vessels and combustion chambers for maritime use. Must meet all requirements of marine engineering inspection.

MARTEMPERING

The process of quenching an austenitized ferrous alloy in a medium at a temperature in the upper portion of the temperature range of martensite formation, or slightly above that range, and holding in the medium until the temperature throughout the alloy is substantially uniform. The alloy is then allowed to cool in air through the temperature range of martensite formation.*

MARTENSITE

An unstable constituent in quenched steel, formed without diffusion and only during cooling below a certain temperature. The structure is characterized by its acicular appearance on the surface of a polished and etched specimen. Martensite is the hardest of the transformation products of austenite. Tetragonality of the crystal structure is observed when the carbon content is greater than about 0.5 pct.*

MAXIMUM CORE LOSS

That part of the electrical energy required to magnetize a core of magnetic material that is dissipated as heat generated within the core, as distinguished from the energy lost in the coil surrounding the core. Core loss is made up of two components: hysteresis and eddy current losses.

McQUAID-EHN TEST

A special test for revealing grain size when the steel is heated above the critical range. The test sample is immersed in a carbonaceous medium, heated to 1700°F for a designated period of time and then allowed to cool. The treatment causes the grains of the steel to be outlined sharply when polished, etched and viewed under a microscope. There are eight standard McQuaid-Ehn grain sizes, ranging from No. 8, the finest to No. 1, the coarsest.

MECHANICAL PROPERTIES

Those properties of a material that reveal the elastic and inelastic reaction when force is applied, or that involve the relationship between stress and strain; for example, the modulus of elasticity, tensile strength and fatigue limit. These properties have often been designated as "physical properties," but the term "mechanical properties" is much to be preferred.*

MECHANICAL WORKING

Subjecting metal to pressure exerted by rolls, dies, presses or hammers, to change its form or to affect the structure and consequently the mechanical and physical properties.*

MENDERS

Plates which show a defect in the tin coating which can be rectified by passing the plate through a tinning unit a second time. Retinning converts a mender into a prime.

METALLURGY

The science which deals with the extraction of metals from their ores and the adaptation and application of these metals to the uses for which they are intended.

MICROCLEANLINESS

Refers to the extent or quantity of nonmetallic inclusions observed by examination under a microscope.

MICROSCOPIC TESTS

Tests used in studying inclusions, segregation and structure. Microscopic studies may be supplemental and coordinated with other tests.

MILL EDGE

Normal rounded edge produced in hot rolling. Does not conform to any standard radius. This replaces the old term, band edge.

MILL FINISH

A surface finish produced on sheet and plate, characteristic of the ground finish on the rolls used in fabrication.*

MILL LENGTH

Those lengths which can be most economically handled by the mill. Upper and lower limits are set by equipment limitations in the mill.

MINE TIES

A fabricated channel-like structure used to support track in mines.

MISRUNS

Cast metal that was poured too cold so that it solidified before filling the mold completely.*

MOLD

A form or cavity into which molten metal is poured to produce a desired shape.*

MOLYBDENUM

A special alloying element commonly used to increase hardenability of steel. Molybdenum is sometimes added to Stainless Steel to enhance its corrosion resistance to certain chemicals. Molybdenum is commonly called "moly".

MOLYBDENUM OXIDE

A commercial compound of molybdenum (MoO_3) which is used as a finishing agent in making molybdenum steels.

MULTIPLE LENGTHS

A piece length consisting of a combination of two or more unit lengths as designated by a customer.

MULTIPLE LIFT PACKAGE

A full size package divided into loose, unwrapped lifts of less than 10,000# each, with metal or wood separators. Individual lifts are limited to 2000# minimum.

MULTIPLE WEAR WHEELS

Multiple wear wheels have a rim thickness of 2½ in. or more, and may be machined two or more times to the original tread and flange contour. They are used on all passenger cars equipped with steel wheels and on some cars for rapid freight use. After much wear, multiple wear wheels are sometimes remachined and used as "one-wear" wheels on cars for slow-moving freight.

— N —

NECKING DOWN

The narrowing, or constricting to a smaller cross-sectional area, which occurs at a localized place on a tensile test piece while it is being pulled.

NICKEL

A metallic element used in some steels. See Pig Nickel, Electrolytic Nickel.

NITRIDING

A process of case hardening in which a ferrous alloy, usually of special composition, is heated in an atmosphere of ammonia or in contact with nitrogenous material to produce surface hardening by the absorption of nitrogen, without quenching.*

NON-STANDARD STEEL

A steel is classed as non-standard when the chemical composition or mechanical properties specified do not coincide with or encompass the ranges or limits of a standard steel (AISI or ASTM), or when restricted ranges or limits are outside the ranges or limits of a standard steel.

NORMALIZE

The normalizing process which is commonly applied to steel articles of heavy section consists of: heating to a temperature about 100°F above the critical range and cooling in still air.

NOTCH BRITTLENESS

Susceptibility of a material to brittleness in areas containing a groove, scratch, sharp fillet or notch.*

NOTCHED INGOTS

Castings with deep grooves designed to facilitate breaking for remelting.*

NOTCH FATIGUE FACTOR

The reduction caused in fatigue strength by the presence of a sharp notch in the stressed test section.*

NOTCH SENSITIVITY

The reduction caused in nominal strength, impact or static, by the presence of a stress concentration, usually expressed as the ratio of the notched to the unnotched strength.*

— O —

OFF SIZE

Rolled steel, too light or too heavy to meet requirements.

OILED

Application of a suitable oil to final product to retard rusting. Where surface is a consideration, it is also desirable in reducing friction scratches that may develop in transit. The oil coating is not intended to serve as a lubricant for subsequent fabrication.

ONE-WEAR WHEELS

One-wear wheels have the rim thickness designed so that retreading is not permissible once they have been worn to the condemning limit.

OPEN HEARTH FURNACE

A furnace for melting metal, in which the bath is heated by the convection of hot gases over the surface of the metal and by radiation from the roof.*

ORE

A mineral from which the metal can be extracted profitably.*

OVALS

A hot rolled carbon steel bar product which is oval in cross section.

OVERFILL

A defect in a rolled bar or other section which is an overfullness on some part of the surface. Among the causes are worn rolls and extrusion into the clearance of the rolls.

OXIDE

Usually refers in the steel industry to oxide of iron, of which there are three principal ones: FeO, Fe_3O_4, Fe_2O_3. In addition, there are many mixtures of these oxides which form on the surface of steel at different temperatures and give the steel different colors, such

as yellow, brown, purple, blue and red. Oxides must be thoroughly removed from the surface of steel objects which are to be coated with tin, zinc, or other metals. See Scale.

OXIDIZE

A chemical treatment which increases the positive valences of a substance. In a limited sense, adding oxygen to a substance, as in oxidizing C to CO, CO to CO_2, Si to SiO_2, Mn to MnO.

OXIDIZING AGENT

A substance added to a mixture for the purpose of oxidizing some constituents. For example, iron ore (Fe_4O_3) is used in an open hearth furnace to furnish oxygen for the removal of Si, Mn, P and C, by converting them to SiO_2, MnO, P_2O_5 and CO.

— P —

PACK ROLLING

Rolling two or more pieces of thin sheet at the same time, a method usually practiced in rolling sheet into thin foil. This method permits more accurate control of thickness than individual rolling.*

PACKAGE

A bundle or a number of bundles, secured into a single unit.

PACKAGING

Refers, in the steel industry, to most economical and safest method of grouping finished or semi-finished steel products for loading and transporting to the customer.

PASS

1. Movement of a piece of steel through a stand of rolls. 2. The open space between two grooved rolls through which is rolled the steel which is being processed.

PATENTING

In wire making, a heat treatment applied to medium-carbon or high-carbon steel before the drawing of wire or between drafts. This process consists in heating to a temperature above that range, in air or in a bath of molten lead or salt maintained at a temperature appropriate to the carbon content of the steel and to the properties required of the finished product.*

PATTERN

(1) A form, frequently of wood, around which sand is packed to make a mold for casting metals. (2) A full-scale reproduction of a part used as a guide in cutting. (3) A regular array of characters, such as an X-ray diffraction pattern.*

PEARLITE

The lamellar aggregate of ferrite and carbide.

NOTE: It is recommended that this word be reserved for the microstructures consisting of thin plates or lamellae—that is, those that may have a pearly luster in white light. The lamellae can be very thin and resolvable only with the best microscopic equipment and technique.*

PERMEABILITY

(1) Magnetic permeability, the ratio of the magnetic induction to the intensity of the magnetizing field. (2) In a mold, the porosity of f oundry sands and the ability of trapped gases to escape through the sand.*

PHYSICAL METALLURGY

The adaption of the metal to its intended uses, a part of ferrous metallurgy dealing chiefly with physical changes produced in the properties of the metal after chemical composition has been nearly entirely fixed.*

PHYSICAL PROPERTIES

Those properties familiarly discussed in physics, exclusive of those described under mechanical properties; for example, density, electrical conductivity, coefficient of thermal expansion. This term has often been used to describe mechanical properties, but this usage is not recommended. See mechanical properties.*

PICKLE

Chemical or electrochemical removal of surface oxides.*

PIG

An ingot of virgin or secondary metal to be remelted for use.*

PIG IRON

Iron produced by reduction of iron ore in the blast furnace.*

PILING

A form of rolled structural shape of two types: sheet piling, and bearing piling. The three forms of sheet pile—straight, arch type and zee—are used for such types of construction as docks, breakwaters, coffer dams, etc. Bearing piles, which range from 14 in. to 8 in. in depth, are heavy, wide flange sections for foundation work, etc.

PINCH PASS

A pass of sheet through rolls that are set to give a very light reduction.*

PIPE

A cavity formed by contraction in metal (especially

ingots) during solidification of the last portion of liquid metal.*

PIT

A sharp depression in the surface of metal.*

PLAIN CARBON SCRAP

Scrap steel with less than: 1.65 pct manganese, 0.60 pct silicon, 0.60 pct copper, or any other alloying element added for a special alloying effect.

PLASTIC DEFORMATION

Permanent distortion of a material under the action of applied stresses.*

PLASTICITY

The ability of a metal to be deformed extensively without rupture.*

PLATE

Carbon steel plates comprise that group of flat rolled finished steel products within the following size limitation:

0.180 in. or thicker, over 48 in. wide;
0.230 in. or thicker, over 6 in. wide;
7.53 lb/sq ft or heavier, over 48 in. wide;
9.62 lb/sq ft or heavier, over 6 in. wide.

PLY METALS

Sheet consisting of bonded layers of dissimilar metals. See cladding.*

POROSITY

Unsoundness caused in cast metals by the presence of blowholes and shrinkage cavities.*

POURING

The transfer of molten metal from the ladle into ingot molds or other types of molds; for example, in castings.*

POWER REELS

Drums that coil strip and pull it through rolls that are not driven. See Steckel mill.*

PREHEATING

(1) A general term used to describe heating applied as a preliminary to some further thermal or mechanical treatment. (2) A term applied specifically to tool steel to describe a process in which the steel is heated slowly and uniformly to a temperature below the hardening temperature and is then transferred to a furnace in which the temperature is substantially above the preheating temperature.*

PRESS FORGING

The forging process in which metal stock is formed between dies, usually by hydraulic pressure. Press forging is an operation that employs a single, slow stroke. Compare with hammer forging.*

PRIMARY SCALE

Oxide of iron (Fe_3O_4) which is formed while the steel is being heated.

PRIMES

Metal products such as sheet and plate, of the highest quality and free from visible surface defects.*

PROCESS ANNEALING

In the sheet and wire industries, a process by which a ferrous alloy is heated to a temperature close to, but below, the lower limit of the transformation range and is subsequently cooled. This process is applied in order to soften the alloy for further cold working.*

PROCESS METALLURGY

The science of obtaining metals from their ores.*

PROOF STRESS

In a test, stress that will cause a specified permanent deformation in a material, usually 0.01 pct or less.*

PROOF TEST

Any type of test to indicate that the material or structure is suitable for the purpose intended.

PROPORTIONAL LIMIT

The greatest stress a material is capable of sustaining without a deviation from the law of proportionality of stress and strain. If the load is removed for any stress up to this point, the material will spring back, or assume its original dimensions.

PUNCHING

Shearing holes in sheet metal with punch and die.*

PUSH BENCH

Equipment used for drawing heavy-gage tubes by cupping sheet and forcing it through a die by pressure against the bottom of the cup.*

PYROMETER

An instrument of any of various types used for measuring temperatures.*

— Q —

QUALITY

Refers to the suitableness of the steel for the purpose or purposes for which it is intended.

QUENCH HARDENING

A process of hardening a ferrous alloy of suitable composition by heating within or above the transformation range and cooling at a rate sufficient to increase the hardness substantially. The process usually involves the formation of martensite.*

QUENCHING

A process of rapid cooling from an elevated temperature by contact with liquids, gases or solids.*

QUENCHING CRACK

A fracture resulting from thermal stresses induced during rapid cooling or quenching. Frequently encountered in alloys that have been overheated and liquated and are thus "hot short."

— R —

RABBLING

A raking or stirring operation performed on a charge of ore or semimolten metal either by hand or mechanically.*

RABBLES

Rakes for rabbling. Usually made of wood.*

RAGGING

Roughening indentations or channels cut into the surface of a roll for the purpose of increasing its grip on a piece of steel entering the pass. Ragging is used particularly in blooming mills and other roughing stands.

RAGGING MARK

The raised portions on the surface of a bloom, a billet, or other body of semifinished steel, caused by the flow of steel into the ragging depressions of roughing mill rolls. If the ragging is improperly designed, the ragging marks may cause laps on finished products.

RAILS, STANDARD TEE

Rails which weigh more than 60 lb per lineal yard.

RANDOM LENGTHS

Lengths can be specified. But if random lengths are permitted, cutters have a spread from 2 to 5 ft, depending on ordered length and size.

RECARBURIZERS

Material added to molten steel to increase its carbon content; e.g., anthracite coal (slack) or hot metal.

RECUPERATOR

A piece of equipment for recovering heat from hot, spent gases and using it for the preheating of incoming fuel or air. This is a continuous operation, in which the incoming materials pass through pipes surrounded by a chamber through which the outgoing gases pass.*

RED SHORTNESS

Brittleness in steel when it is red hot.*

REFINING TEMPERATURE

A temperature, usually just higher than the transformation range, employed in the heat treatment of steel to refine the structure—in particular, the grain size.*

REFRACTORY

Ideally, any substance which is infusible at the highest temperature it may be required to withstand in service. A perfect refractory, which does not exist at present, would be one which: (1) would not fuse or soften, (2) would not crumble or crack, (3) its contraction and expansion would be the minimum, (4) would not conduct heat, and (5) would be impermeable to high temperature gases and liquids, (6) would resist mechanical abrasion, and (7) it would not react chemically with substances in contact with it.

REGENERATOR

Equipment used for recovering heat from hot, spent gases from a furnace. The regenerator differs from the recuperator in that the hot spent gases are used to heat a brick checkerwork; then after the flow of exhaust gases has been turned off, the gases to be preheated are passed through the checkerwork.*

REGULAR SECTIONS

Are those carbon steel structural sections for which there is a popular, constant demand, and, consequently, are rolled frequently.

REJECTS

(1) Sheets—a secondary product of a single size and gage. (2) Plates—a specific size and gage containing minor defects.

ROCKING SHEAR

One type of shear for cutting steel plates. The upper

knife blade is shaped somewhat like the rocker of a rocking chair. This was designed to avoid shear bow, a bend in plates sometimes caused by guillotine shears.

ROD MILL

(1) A mill for fine grinding, somewhat similar to the ball mill, but employing long steel rods instead of balls as the grinding medium. (2) A mill for rolling metal rod.*

ROD TEST FOR TEMPERATURE

A practical test for determining whether a heat of open hearth steel is hot enough for tapping. One end of a low carbon bar is held beneath the surface of the bath until it has melted off. The appearance of the melted end of the bar indicates to the experienced man whether the bath is hot enough for tapping.

ROLL SCALE

Oxide of iron which forms on the surface of steel while it is being heated and rolled. Much of the scale is cracked and loosened during the rolling operation and may fall off the piece naturally or be blown off by high-pressure water sprays or other means.

ROLLED EDGE

The edge a universal plate has when rolled by vertical, as well as horizontal rolls. On these plates edge shearing is not necessary. See Universal Plate Mill.

ROLLED RAIL CLIPS

Clips that are rolled as bar sections. Used to clip or hold rails to fabricated ties. Used primarily in mines.

ROLLER

(1) In rolling mill terminology, a part of a roller table which transports steel from stand to stand as contrasted with "roll" which is a part of a stand of rolls and serves to reduce the cross section of the steel specimen which is being rolled. (2) Term applied to the man in charge of the actual rolling.

ROLLER FLATTENING

The process in which a series of staggered rolls of small diameter is used to remove bow and waves from sheet. While passing through the rolls, the sheet is bent back and forth slightly and is delivered approximately flat.*

ROLL FORMING

(1) An operation used in forming sheet. Strips of sheet are passed between rolls of definite settings that bend the sheet progressively into structural members of various contours, sometimes called "molded sections." (2) A process of coiling sheet into open cylinders.*

ROLL TABLE

A conveyer-type table surface that contains a series of small rolls over which metal products pass during processing.*

ROLL THREADING

Applying a thread to a bolt or screw by rolling the piece between two grooved die plates, one of which is in motion, or between rotating grooved circular rolls.*

ROUGHING STAND

The rolls used for breaking down the ingot or billet in the preliminary rolling of metal products.*

ROUND CORNERED SQUARES

A bar product square in cross sections with rounded corners with size ranges 3/8 in. to 8 in., inclusive.

RUNNER

A channel through which molten metal or slag is passed from one receptacle to another; in a casting mold, the portion of the gate assembly that connects the downgate or sprue with the casting.*

RUNOUT

Escape of molten metal from a furnace, mold or melting crucible.*

— S —

SAMPLING

The cutting or baring of samples for testing.

SCAB (SCABBY)

A blemish caused on a casting by eruption of gas from the mold face, or by uneven mold surfaces; or occurring where the skin from a blowhole has partly burned away and is not welded. They also result from splashing of molten metal on mold walls during teeming.*

SCALE

An oxide of iron which forms on the surface of hot steel. Sometimes it forms in large sheets which fall off when the steel is rolled. See also Roll Scale.

SCALPING

Machining the surface layers from ingots, billets and slabs before fabrication.*

SCARFING

Cutting surface areas of metal objects, ordinarily by using a gas torch. The operation permits surface defects to be cut from ingots, billets, or the edges of plate that is to be beveled for butt welding. See Chipping.*

SCRAP

Iron or steel discard, or cuttings, or junk metal, which can be reprocessed.

SCRAPPING

The act of discarding a piece of steel or of cutting it into sizes convenient for handling as scrap.

SCREW STOCK

Metal in the form of wire or rod, ordinarily a free-machining type of alloy, used for making screw-machine products.*

SEAM

On the surface of metal, a crack that has been closed but not welded; usually produced by some defect either in casting, or in working, such as blow-holes that have become oxidized or folds and laps that have been formed during working. Seam also refers to lap joints as in seam welding.*

SECONDARY PRODUCTS

Those products which for any reason are not prime quality but which are still good for some applications.

SECONDARY SCALE

Oxide of iron which is formed on hot steel while it is being rolled or forged.

SECONDARY CREEP

The secondary portion of the creep curve following the initial creep stage and in which the rate of creep has reached a rather constant value.*

SECONDARY HARDENING

Tempering certain alloy steels at certain temperatures so that a hardness is obtained greater than that resulting from the tempering of the same steel at some lower temperature for the same time.*

SECTION STRIP

A class of high carbon quality steel used for agricultural cutter blades.

SEGREGATION

The result of the natural phenomenon in the solidification of a steel ingot in which various components of the steel having the lowest freezing point are concentrated in parts of the ingot last to solidify.

SELECTIVE HEATING

A process by which only certain portions of an object are heated, in a way that will produce desired properties after cooling.*

SELECTIVE QUENCHING

A process by which only certain portions of an object are quenched.*

SELF-HARDENING STEEL

A steel containing sufficient carbon or alloying element or both, to form martensite either through air hardening or, as in welding and induction hardening, through rapid removal of heat from a locally heated portion by conduction into the surrounding cold metal. See also air-hardening steel.*

SEMI-FINISHED STEEL

Steel in the form of ingots, blooms, billets, or slabs for forging or rolling into a finished product.

SEMI-KILLED STEEL

Steel incompletely deoxidized, to permit evolution of sufficient carbon monoxide to offset solidification shrinkage.*

SHAKE-OUT

The operation of removing castings from the mold.*

SHEAR

In a steel mill, a machine for cutting steel products. There are many kinds of shears, but the general principle is the same as that used for shearing cloth or paper—the work is held upon a lower blade and an upper blade is thrust down, severing the piece. Steel shears may be classified: as to kind of drive—hydraulic and electric; as to the work done—cropping, squaring, slab, bloom, billet, bar shears; as to type of mechanism—rotary, rocking, gate, guillotine, alligator shears; as to movement of work while shearing—flying shears.

SHEAR BLADE

The replaceable steel shapes carrying a knife edge that provide the cutting edges of a shear.

SHEAR BOW

A bend in one end of a plate caused by cutting with a guillotine shear.

SHEAR KNIFE

See Shear Blade.

SHEARED EDGE

The more or less jagged edge of a plate or sheet caused by shearing.

SHEARED PLATE MILL

A mill for the rolling of plates which, because no edging rolls are used, must be sheared on all four edges.

SHEARING TEST PIECE

Cutting a sample for physical testing from a piece of steel by shearing.

SHELL

(1) An article formed by deep drawing. (2) The metal sleeve remaining when a billet is extruded with a dummy block of somewhat smaller diameter.*

SHEET NICKEL

Nickel which has been prepared electrolytically. See Electrolytic Nickel.

SHEET PILING

One of many regular structural sections used primarily for jetties, harbor walls, coffer dams, and for retaining walls around excavations.

SHORTNESS

Brittleness in metal.*

SHORTS

In the screening of crushed ores, the product remaining on the screen or sieve (as opposed to fines, which pass through).*

SHRINKAGE CAVITY

A void left in cast metals as a result of solidification shrinkage and the progressive freezing of metal towards the center.*

SHROUDING

Protecting material with a loose covering of waterproof paper or other suitable material. Only the top and sides of the material are covered.

SILICO MANGANESE

An alloy containing silicon and manganese. In the open hearth process, it is used as a deoxidizer in the furnace and for the introduction of manganese and silicon into steel.

SINKHEAD

A reservoir insulated to retain heat and to hold excess molten metal on top of an ingot mold, in order to feed the shrinkage of the ingot. Also called "shrink head" or "feeder head."*

SINTER

In blast furnace usage, lumpy material which has been prepared from flue dust. The dust is agglomerated by heating it to a high temperature. Sinter contains valuable amounts of combined iron.

SKELP

A plate of steel or wrought iron from which pipe or tubing is made by rolling the skelp into shape longitudinally and welding or riveting the edges together.*

SKETCH PLATES

Plates cut to shapes other than rectangular.

SKETCHING

In plate mills, the marking of plates so as to indicate where they are to be sheared.

SKIN

A thin surface layer that is different from the main mass of a metal object, in composition, structure or other characteristics.*

SLAB

A semifinished block of steel cut from a rolled ingot, with its width at least twice its thickness. It differs from a bloom which is square or nearly so. Slabs are the product of a slabbing mill, or a blooming mill.

SLAB SHEAR

A shear for cutting a rolled ingot into slab lengths. This shear also cuts off the discard or crop.

SLABBING MILL

A mill which rolls ingots into slab shapes.

SLAG

A product resulting from the action of a flux on the nonmetallic constituents of a processed ore, or on the oxidized metallic constituents that are undesirable. Usually slags consist of combinations of acid oxides with basic oxides, and neutral oxides are added to aid fusibility.*

SLAG TOP

A variation of the Hot Top.

SLING

The ropes or cables used for bundling materials which are to be lifted by a crane.

SLIT

A No. 3 edge is commonly referred to as a slit or sheared edge and is produced by trimming the edges of the strip in a rotary shear. Narrow widths are frequently procured from wide strip and are slit in multiples, two or more strips resulting.

SLIVERS

Defects in the nature of irregularly shaped pieces of steel clinging loosely to finished steel. Slivers may result from defective composition (over-oxidized, high sulfur); defective teeming of molten steel; defective heating (burning); tearing of corners in early stages of rolling; etc.

SNAKE

Any crooked surface defect in a plate, resembling a snake.

SMELTING

A metallurgical thermal processing operation in which the metal or matte is separated in fused form from nonmetallic materials or other undesired metals with which it is associated.*

SOAK

To hold an ingot, slab, bloom, billet or other piece of steel in a hot chamber or pit to secure uniform temperature throughout. Freshly stripped ingots are hottest in the interior, whereas a cold object which is being heated is hottest at the surface. The term is used in connection with heating of steel whether for forging or rolling or for heat treatment.

SOAKING PIT

A furnace or pit for the heating of ingots of steel to make their temperature uniform throughout.

SOLDERING

Joining metals by fusion of alloys that have relatively low melting points—most commonly, lead-base or tin-base alloys, which are the soft solders. Hard solders are alloys that have silver, copper, or nickel bases and use of these alloys with melting points higher than 800°F is generally termed brazing.*

SOLIDIFICATION SHRINKAGE

The decrease in size accompanying the freezing of a molten metal.*

SOLUTION HEAT TREATMENT

A process in which an alloy is heated to a suitable temperature, is held at this temperature long enough to allow a certain constituent to enter into solid solution and is then cooled rapidly to hold the constituent in solution. The metal is left in a supersaturated, unstable state and may subsequently exhibit age hardening.*

SPALLING

The cracking and flaking of metal particles from a surface.*

SPECIAL BAR QUALITY

A quality suitable for forging, heat treating, cold drawing, turning, etc. These applications require special manufacturing control for chemical composition, deoxidation, mold practice, pouring, discard, surface preparation, heating, rolling, cooling, testing, and inspection.

SPECIAL DISCARD

An unusually large percentage of crop end which is sheared from the slab, bloom, or billet to eliminate all traces of pipe.

SPECIAL KILLED STEELS

Low carbon aluminum-killed steels used mainly for extra deep drawing varieties of sheet and strip.

SPECIAL REQUIREMENT FORGING QUALITY STEEL

A special grade of semifinished steel (blooms, billets, or slabs) which must meet specified requirements. It must usually pass one or more special tests, such as check analysis, fracture test, etch test, microscopic examination, heat treatment test, etc.

SPECIAL SECTIONS

Carbon steel structural or bar sections which, due to fluctuating demand, are rolled at irregular intervals or by special arrangement between customer and producer.

SPECIAL STRAIGHTNESS

When material is desired to closer-than-standard straightness tolerances (as set forth in AISI manual), it may be ordered to special straightness. Such straightening is done by machinery and may result in increased surface hardness in localized areas of the steel.

SPECIALTIES

Products that usually involve engineering and further fabrication of rolled products.

SPECIFIED DISCARD

Discard specified in the customer's specifications, usually taken on the ingot.

SPECIFIED GRAIN SIZE

Grain sizes are classified into eight sizes, 1-5 being coarse, 5-8 being fine. Grain size can only be specified coarse or fine—except in alloy steels, which allow a more restrictive requirement.

SPECIFIED LENGTHS

Lengths that are ordered but which allow mill to ship a certain percentage of shorts; usually carries an extra.

SPHEROIDIZING

Any process of heating and cooling that produces a rounded or globular form of carbide in steel. Spheroidizing methods frequently used are: (1) Prolonged holding at a temperature just below Ae_1, (2) Heating and cooling alternately between temperatures that are just above and just below Ae_1, (3) Heating to a temperature above Ae_1 or Ae_3 and then cooling very slowly in the furnace, or holding at a temperature just below Ae_1, (4) Cooling at a suitable rate from the minimum temperature at which all carbide is dissolved, to prevent the re-formation of a carbide network, and then reheating in accordance with method 1 or 2 above (applicable to hypereutectoid steel containing a carbide network).

SPIEGELEISEN (ALSO SPIEGEL)

A pig iron containing 15 to 30 pct Mn and 4.5 to 6.5 pct C.*

SPIKING THE HEAT

The adding of ferromanganese, silico-manganese, or other deoxidizing agent, to an open hearth bath for

the immediate stoppage of oxidizing action. This is sometimes called blocking the heat.

SPONGE IRON

The material produced by the reduction of iron oxide with carbon, without melting.*

SPOT WELDING

An electric-resistance welding process in which the fusion is limited to a small area. The pieces being welded are pressed together between a pair of water-cooled electrodes through which an electrical current is passed during a very short interval so that fusion occurs over a small area at the interface between the pieces.*

SQUARING SHEAR

A shear for trimming sheets or tin plate so as to true up the edges, bring to close tolerances in dimensions and make the corners 90 degrees.

STABILIZING ANNEAL

A treatment applied to austenitic stainless steels that contain titanium or columbium. This treatment consists of heating to a temperature below that of a full anneal in order to precipitate the maximum amount of carbon as titanium carbide or columbium carbide. This eliminates precipitation at lower temperatures, which might reduce the resistance of the steel to corrosion.*

STABILIZING TREATMENT

A thermal treatment designed to precipitate material from solid solution, in order to improve the workability, to decrease the tendency of certain alloys to age harden at room temperature, or to obtain dimensional stability under service at slightly elevated temperatures.*

STAINLESS

(1) A trade name given to alloy steel that is corrosion and heat resistant. The chief alloying elements are chromium, nickel and silicon in various combinations with a possible small percentage of titanium, vanadium, etc. (2) by AISI definition, a steel is called "Stainless" when it contains 4 pct or more chromium.

STAINLESS STEEL

Any steel containing four or more pct chromium is classified as stainless. However, there are many grades for specific purposes. These grades may contain nickel or molybdenum or both, but always chromium.

STAMPING OF RAILS

The practice of stamping in cut figures a record on the side of a rail indicating heat number, position in the ingot, and ingot number of the steel from which the rail is made.

STAND OF ROLLS

The simplest unit of a rolling mill, consisting of a set of rolls, the housings, bearings, guides, etc., which are required for the rolling of steel.

STANDARD I-BEAM

A structural steel beam with sloping or tapered flanges and a range of 3 in. to 24 in. between the outside surface of the flanges. The widest flange is 8 in.

STEEL LADLE

A vessel for receiving and handling liquid steel. It is made with a steel shell, lined with refractories.

STEEL SCRAP

Steel discard, cuttings, drillings, ingot butts, or other steel material which is useless except for remelting.

STRAIGHTENING

The removal of sweep and camber by roller straightening or by use of the gag press.

STRAIN HARDENING

An increase in hardness and strength caused by plastic deformation at temperatures lower than the recrystallization range.*

STRESS

The load per unit of area. Ordinarily stress-strain curves do not show the true stress (load divided by area at that moment) but a fictitious value obtained by using always the original area.*

STRESS RELIEVING

A process of reducing residual stresses in a metal object by heating the object to a suitable temperature and holding for a sufficient time. This treatment may be applied to relieve stresses induced by casting, quenching, normalizing, machining, cold working or welding.

STRETCHER LEVELED STANDARD

Special flattening methods used on sheets when commercial standard of flatness is not satisfactory. In stretcher leveling the sheets are held at each end by grips and stretched by slowly forcing the grips apart. The ends of the sheets will be disfigured by grip marks and an allowance in length must be made if this is objectionable.

STRETCHER FLATTENING

A process for removing bow and warpage from sheet by applying a uniform tension at the ends so that the piece is elongated to a definite amount of permanent set.*

STRETCHER STRAIGHTENING

A process for straightening rod, tubing and shapes by the application of tension at the ends of the stock. The products are elongated a definite amount to remove warpage.*

STRIP, HOT ROLLED CARBON STEEL

Flat hot rolled carbon steel produced in coils or in cut lengths is classified as hot rolled carbon steel strip when within the following size limitations:

Width	*Thickness*
up to 3½ in. incl.	.0255 to .2030 in. incl.
over 3½ to 6 in. incl.	.0344 to .2030 in. incl.
over 6 to 12 in. incl.	.0568 to .2299 in. incl.

STRIPPING

Removing coated or electrolytically deposited metal or oxides from the base.*

STRUCTURAL

A generic term for all forms of iron and steel used in constructing buildings, bridges, etc., of considerable strength and toughness.

STRUCTURAL QUALITY

Material applicable to the various classes of structures, indicated by the standard specifications, which is suitable for the different mechanical operations employed for the fabrication of such structures. Structural quality (the characteristics of which are defined in the standard specifications of the American Society for Testing Materials) represents the quality of steel produced under regular or normal manufacturing conditions.

STRUCTURAL SHAPES

The general term applied to the rolled flanged sections having at least one dimension of their cross section 3 in. or greater. Used in construction of bridges, buildings, ships, railroad rolling stock, and for numerous other constructional purposes.

SURFACE CHECKING

General breaking and cracking of the surface, which may result from a variety of causes, such as overrolling, overforming, or atmospheric attack at grain boundaries.*

SURFACE INSPECTION

The inspection of the surface of products for defects such as: ingot cracks, scabs, seams, burned steel, laps, twist, guide marks, etc.

— T —

TAILING (TAILS)

The worthless portion of a crushed ore, separated during concentration.*

TANDEM MILL

A mill with a number of stands in succession.

TAPPING

The act of draining molten metal from furnace to ladle.

TEE RAILS

The term "tee" is used to designate the general class of rail designs which resemble the letter "T" and to distinguish them from girder rails. Section consists of head for the wheel treads and for guiding the wheel flanges; a web for girder strength and a base for bearing and for fastening the rail to its support. Standard tee rails are those sections having a nominal weight of more than 60 lb per lineal yard, while sections of 60 lb and less per lineal yard are known as light rails.

TEEMING

Pouring metal into ingot molds. See Pouring.*

TEES

Structural steel sections having a pattern like the letter "T". When the two elements of a "tee"—the flange and the stem—are the same length, the section is known as an equal tee; otherwise, an unequal tee. The shape is specified by width of flange, length of stem and weight per foot.

TEMPER

A condition produced in a metal or alloy by mechanical or thermal treatment and having characteristic structure and mechanical properties. A given alloy may be in the fully softened or annealed temper, or it may be cold worked to the hard temper, or further to spring temper. Intermediate tempers produced by cold working (rolling or drawing) are called "quarter-hard," "half-hard" and "three-quarters hard," and are determined by the amount of cold reduction and the resulting tensile properties. In addition to the annealed temper, conditions produced by thermal treatment are the solution heat treated temper and the heat treated and artificially aged temper. Other tempers involve a combination of mechanical and thermal treatments and include that temper produced by cold working after heat treating, and that produced by artificial aging of alloys that are as-cast, as-extruded, as-forged and heat treated, and worked.*

TEMPERING

A process of reheating quench-hardened or normalized steel to a temperature below the transformation range, and then cooling at any rate desired.*

TENSILE STRENGTH

The value obtained by dividing the maximum load observed during tensile straining until breakage occurs by the specimen cross-sectional area before straining. Also called "ultimate strength."

TERNARY ALLOY

An alloy that contains three principal elements.*

TERNEPLATE

Steel sheet, hot dip coated with terne metal (10-15 pct tin; 85-90 pct lead).

THERMAL STRESSES

Stresses in metal, resulting from nonuniform distribution of temperature.

THERMITE WELDING

The welding together of two railroad rails, or other steel objects, by running molten iron into the space between them. The molten metal is produced by igniting a mixture of iron oxide and finely divided aluminum powder.

THREE-HIGH MILL

A stand which has three rolls, one above the other. The steel which is being rolled passes one way between the bottom and middle rolls, and the other way between the middle and top rolls.

TIE PLATES

A rail seat with one or two shoulders, punched with spike holes. The tie plate distributes the load from the rail to the tie, tends to hold it to gage and protects the tie.

TILT-MOLD INGOT

An ingot made by a casting practice employing a book-type mold that has its bottom nearly vertical at the start of the pouring and is gradually tilted back to a normal horizontal position during pouring. The object of such a practice is to reduce the amount of agitation while the metal stream is being poured into the mold and thus to reduce the tendency toward formation of oxide film and entrapment. See Durville Process.*

TINPLATE

A mild steel of low carbon content bearing a coating of commercially pure tin. Two manufacturing processes are in use at the present time, hot dipped and electrolytic tinning lines.

TIN PEST

The tendency of tin cooled to low temperatures, specifically lower than 56°F, to crumble into a powder known as "gray tin," an allotropic modification.*

TINNING

Coating with tin, most commonly by immersion into molten tin; electrodeposition and metal spraying are also used.*

TIGHT COOPERAGE HOOP

Hoop specially designed for making water tight barrels.

TITANIUM

A metal which is commonly added to chrome nickel stainless steel to improve its welding properties. So used, it is called a "stabilizer" or is said to prevent "carbide precipitation." The amount of titanium commonly used for this purpose is 5 to 7 times the carbon content.

TOBACCO HOGSHEAD HOOP

Special quality hoop product beaded on one edge, customarily furnished in 2-in. widths by 22-gage, in cut lengths and with one rounded end.

TOLERANCE LIMIT

(1) The permissible deviation from the desired value. (2) As applied to magnesium alloys, the specific critical amount of an impurity element which, if exceeded, results in a great increase in rate of corrosion in salt solutions.*

TORCH CUTTING

See Flame Cutting.

TORSION

Strain created in a material by a twisting action. Correspondingly, the stress within the material resisting the twisting.*

TOUGHNESS

Property of absorbing considerable energy before fracture; usually represented by the area under a stress-strain curve, and therefore involving both ductility and strength.*

TRAIN OF STANDS

In rolling mill construction, those stands of rolls which are placed side by side, i.e., so that the rolls of the different stands come end to end so that one engine or motor can drive them. Contrast this with stands in tandem.

TRANSITION POINT

The temperature of transformation from one solid crystalline form of a substance to another. More broadly, the point where different phases can exist in equilibrium.*

TUMBLING

Cleaning articles by rotating them in a cylinder with cleaning materials.*

TUNGSTEN

A metal which is sometimes added to steel to make tool steel.

TURNING

A method for removing the surface from a circular piece by bringing the cutting edge of a tool against it while the piece is rotated.

TWO-HIGH MILL

A stand having only two rolls. Some two-high mills are reversing with screw-downs to adjust the rolls; others are one way only and may or may not have screw-downs for roll adjustment and may or may not be a part of a continuous mill.

— U —

U. M. PLATE

Universal Mill Plate, or plate which is rolled to width by vertical rolls as well as being rolled to thickness by horizontal rolls.

UNCROPPED COILS

Coils not sheared to length following hot rolling.

UNDERDRAFT

The tendency of metal to curve downward when leaving rolls, because of lower surface speed of the lower roll.*

UNIVERSAL PLATE MILL

A mill for rolling steel plates, which has vertical as well as horizontal rolls, so that its product has rolled edges.

UPSETTING

(1) A metal working operation similar to forging. (2) The process of axial flow under axial compression of metal, as in forming heads on rivets by flattening the end of wire.*

— V-W-Y-Z —

VICKERS HARDNESS TEST

An indentation hardness test employing a 136-degree diamond pyramid indenter and variable loads enabling the use of one hardness scale from very soft lead to tungsten carbide.*

VIRGIN METAL

Metal obtained directly from ore and not used before.*

VISCOSITY

The resistance of fluid substance to flowing, quantitatively characteristic for each individual substance at a given temperature and under other definite external conditions.*

WASTE WASTE

Slightly defective tin plate that cannot be repaired, but is sold as it. Waste waste is commonly used to make buttons, toys and containers not requiring a perfect tin coating.

WELDING

A process used to join metals by the application of heat. Fusion welding, which includes gas, arc and resistance welding, requires that the parent metals be melted. This distinguishes fusion welding from brazing. In pressure welding joining is accomplished by the use of heat and pressure without melting. The parts that are being welded are pressed together and heated simultaneously, so that recrystallization occurs across the interface.*

WHITE METAL

(1) A general term covering alloys that are based on tin, lead or antimony, such as bearing, type and babbitt metals. (2) A copper matte of about 77 pct Cu obtained from the smelting of sulfide copper ores.*

WIRE ROD

A semifinished product from which wire is made. It is generally of circular cross section approximately ¼ in. in diameter.*

WORK HARDNESS

Hardness developed in metal as a result of cold working. See Cold Working.*

WORKABILITY

The characteristic or group of characteristics that determines the ease of forming a metal into desired shapes.*

WORK ROLLS

Nongrooved rolls which come into contact with the piece of steel (slab, plates, strip or sheet) being rolled. In four-high mills, the rolls which stiffen or strengthen the work rolls are called back-up rolls. The drive spindles are connected with the work rolls.

WORKING THE HEAT

In open hearth practice, the treatment given a bath (heat), during the latter part of the process. It involves the addition of ore or pig iron for the purpose of adjusting the carbon content of the bath.

YIELD POINT

In mild or medium-carbon steel, the stress at which a marked increase in deformation occurs without increase in load. In other steels and in nonferrous metals this phenomenon is not observed. See Yield Strength.*

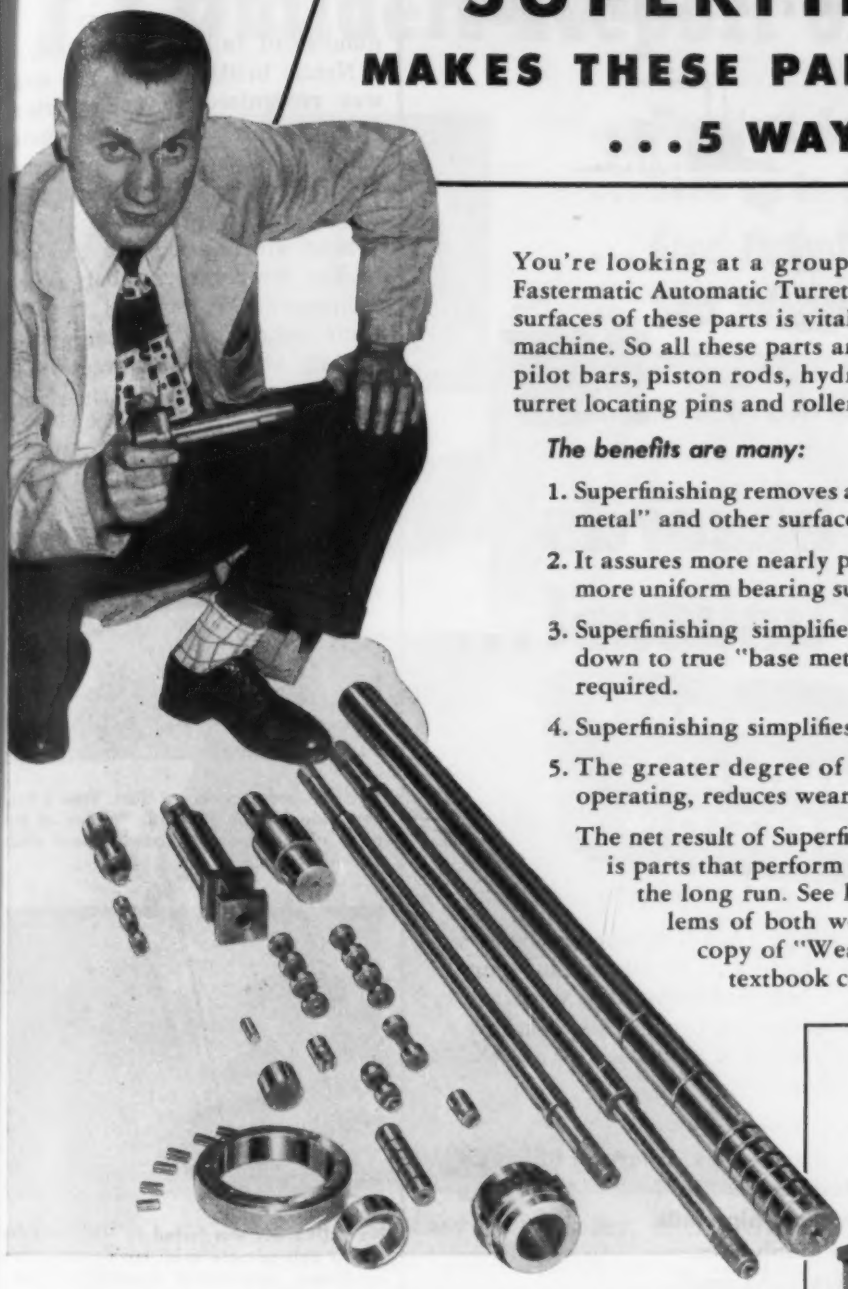
YIELD STRENGTH

The stress at which a material exhibits a specified limiting deviation from proportionality of stress to strain. An offset of 0.2 pct is used for many metals such as aluminum base and magnesium-base alloys, while a 0.5 pct total elongation under load is frequently used for copper alloys.*

ZEES

A structural steel section designated by and similar in pattern to the letter "Z," and are specified by depth, width of flanges and weight per foot.

SUPERFINISH
MAKES THESE PARTS BETTER
. . . 5 WAYS!

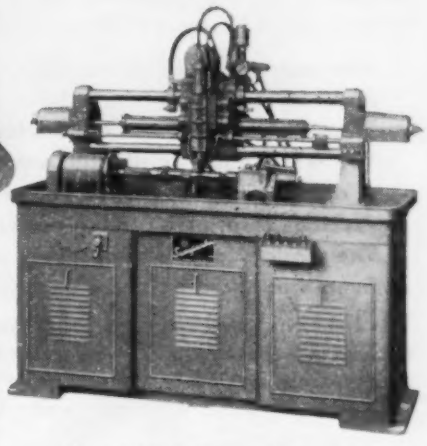


You're looking at a group of parts that go into the Gisholt Fastermatic Automatic Turret Lathe. Super-smoothness of working surfaces of these parts is vital to the precision and long life of the machine. So all these parts are Superfinished—including overhead pilot bars, piston rods, hydraulic control valves, thrust collars, turret locating pins and rollers.

The benefits are many:

1. Superfinishing removes all chatter marks, grinder flats, "smear metal" and other surface irregularities.
2. It assures more nearly perfect geometrical forms. This means more uniform bearing surfaces. They therefore last far longer.
3. Superfinishing simplifies assembly because the surfaces are down to true "base metal"...and no break-in tolerances are required.
4. Superfinishing simplifies grinding and reduces spoilage.
5. The greater degree of smoothness makes the parts easier operating, reduces wear.

The net result of Superfinish here—as it can be in your case—is parts that perform better, last longer and cost far less in the long run. See how Superfinish can solve your problems of both wear and surface roughness. Get your copy of "Wear and Surface Finish," and complete textbook covering all phases of Superfinish.



Model 52-A General-Purpose Superfinisher

THE GISHOLT ROUND TABLE

represents the collective experience of specialists in machining, surface-finishing and balancing of round and partly round parts. Your problems are welcomed here.

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GISHOLT MACHINE COMPANY Madison 10, Wisconsin

TURRET LATHES • AUTOMATIC LATHES • SUPERFINISHERS • BALANCERS • SPECIAL MACHINES

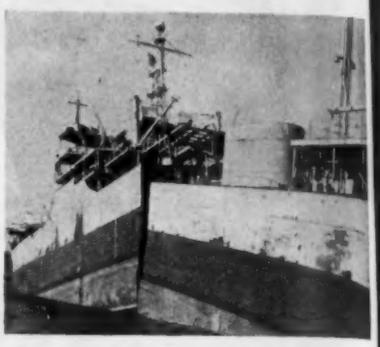
—Technical Briefs—

Continued from Page 148

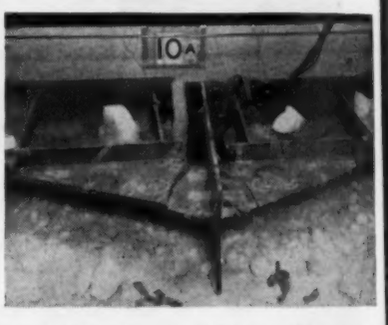
number of failures in tankers.

Notch brittleness of the steel was recognized as an important factor in the failures. Impact tests, using V-notch Charpy specimens of the fracture plates were made to evaluate this factor.

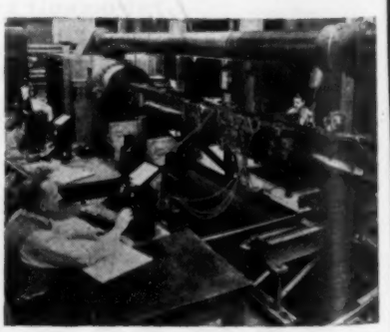
Most steels are notch tough at higher temperatures, but as the temperature is lowered they become more brittle. Energy required to produce fracture is reduced to a small fraction of that



TANKER broke in two at dock. View is from port side looking forward. Position of two parts of ship indicates bending load which caused fracture.



NEW DESIGN was tested by NBS using dry ice to approximate cold weather operating conditions. Interrupted longitudinal specimen sustained load of 960,000 lb.

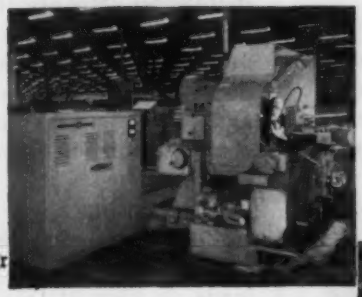


TENSILE CAPACITY of this testing machine is 1,150,000 lb. Room temperature test is being run on interrupted longitudinal specimen.

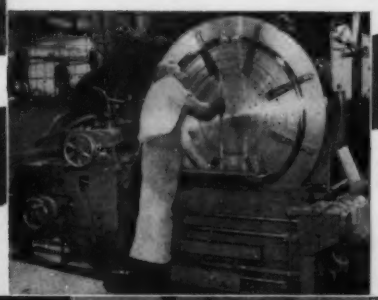
Turn to Page 182

Jet Builders Report on *T* Lathes*

...Excellent Accuracy and Versatility
...Save up to 86% in Time
...Good Output and Design Features
...Best Available



Studebaker Corp.



Pratt & Whitney Aircraft, Div. of United Aircraft Corp.

Hotpoint Co.

T turning large diameter, thin wall, short length components

World leaders in jet engine production, here and abroad, have installed, tested and production-proved Lodge & Shipley T Lathes.

T Lathes are designed specifically for thin-wall, short length and large diameter work that characterizes jet engine production. These lathes have solved the problem of straight and contour facing, turning and boring parts formerly machined on over-size, over-costly, over-clumsy conventional lathes and boring mills. Far faster, more sensitive and accessible, they save cost, time, floor space and assure required accuracy.

Whatever your requirements or production, there is a T Lathe to cut time and costs on large diameter, short length parts machining. With priority assistance, you may be able now to obtain good delivery. Write for new literature and complete details.

8

There are now EIGHT DISTINCT 60" T LATHE TYPES, each designed to speed and simplify machining of any part you may have that is applicable to T turning.

THE **Lodge & Shipley** COMPANY

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which can be absorbed at higher temperatures.

Impact tests indicated the plates in which the ship fractures originated showed higher transition temperatures than plates which did not contain a fracture source.

Further study showed that plates with high transition temperatures, in which fractures are most likely to originate, represent the relatively few plates whose notch sensitivity falls in the tail of the probability curve for steels of the quality used when these ships were built.

Possible Remedies

Two remedies were suggested: (1) Improve the quality of the steel with respect to notch sensitivity. (2) Determine the notch sensitivity of every heat of steel by inspection tests, and reject all heats which fail to meet suitable prescribed standards.

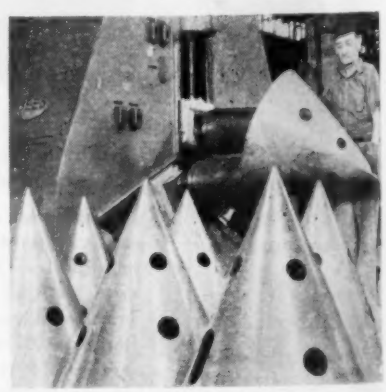
Further analysis showed the notch sensitivity is increased with increasing amounts of carbon and phosphorus, and decreased with finer grain size and with increasing amounts of silicon and manganese, within the range of the chemical compositions of the ship plates studied.

Observations indicated fractures occurred in those parts of the ship sustaining large tensile loads. In view of this and the impracticability of simulating exact shipboard loading conditions, tensile tests of the detail in question were made in the laboratory.

Laboratory Testing

Specimens were similar to ship construction as far as material, plate thickness, and welding procedures were concerned. Stress studies were made at room temperature; tests in which the applied stresses were below the elastic limits of the material. Since a large number of the fractures occurred in cold water, most of the specimens were tested to failure near 0°F.

Some longitudinal specimens were tested at various other temperatures to obtain an indication of the effect of temperature on the mode of fracture.



TAIL CONES for inside J-47 jet engines are being made by Firestone Tire & Rubber Co., once largest manufacturer of stainless steel milk cans and beer barrels. Firestone's Akron plant also makes turbine casings, inner and outer combustion chambers and exhaust cone assemblies. Firestone is one of the largest fabricators of stainless steel in the country and during World War II was a top producer of shatterproof oxygen cylinders for high-altitude flying.

Turn to Page 185

Technical Briefs

SCALE PROBLEM:

Lithium vapor inhibits scale formation, cuts cleaning cost.

Use of lithium for atmosphere control in normalizing of cast crankshafts at Ford Motor Co. of Canada Ltd., has permitted a substantial reduction in cleaning time and cost by providing better control of scale.

Original practice was to completely clean the castings of foundry sand before sending them through the furnace. Castings were cleaned again, following the normalizing operation to remove the scale formed in the furnace.

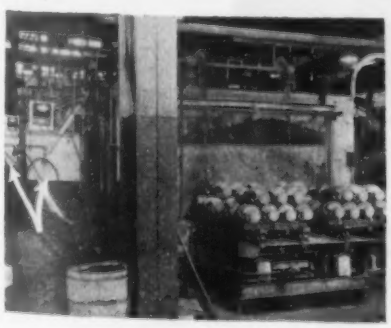
New Method

Believing it preferable to do all cleaning after normalizing, a second method was tried. However, scale already on the work as it came from the foundry sand, plus additional scale formed in heating, produced a surface which required prolonged table blasting of from 12 to 15 passes.

To overcome this condition, expensive in cleaning time, labor and materials, it was decided to adopt a heating method which would reduce the thickness and toughness of the scale on the surface of the castings.

Lithium Vapor

Without changing the existing furnace design or construction, two standard lithium vaporizers were attached to each side of the direct-fired furnace. These are small refractory-lined, gas-fired



LITHIUM VAPORIZERS attached to pusher-type gas-fired furnaces used for normalizing crankshaft castings, reduce scale problem by controlling furnace atmosphere.

Turn to Page 187

PRECISION CIRCULAR CUTTERS

MEYCO carbide tipped and solid carbide cutters have earned an enviable reputation in plants where long tool life and precision workmanship is a MUST.

These cutters can be furnished in various diameters and thicknesses to meet the requirements of individual applications.

Saws and cutters, both carbide tipped and solid carbide, will aid production and precision in your slotting, venting, slitting and grooving operations . . . and they will be manufactured to your specifications. Please furnish complete specs and quantities desired when requesting prices and indicate material to be cut. MEYCO experience in the manufacture of precision tools, since 1888, is at your disposal.

W. F. MEYERS CO., INC., BEDFORD, INDIANA

REVCO SUB-ZERO CHEST TO -95° BELOW ZERO

FOR SHRINK FITS

SEASONING GAUGES and PRECISION TOOLS

FOR TESTS

Completely equipped ready for operation. The 1.5 Cu. Ft. model as shown handles parts or assembled units up to 23″ long, 12½″ deep x 9″ high and the 6.5 Cu. Ft. model up to 47″ lengths, 16″ deep x 15″ high. Revco Sub-Zero Chests meet highest performance standards featuring temperatures of 95° and 85° below zero while running continuously in normal room temperatures. Other controlled low-temperatures readily attained.

REVCO RIVET COOLER for aircraft application is equipped with 90 rivet canisters in six convenient removable racks. Operates efficiently at temperatures as low as minus 35° F.

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LEVIN® MICRO-DRILL PRESS

for holes as small as .002″

Write for Bulletin H describing the Micro-Drill Press and listing collet sizes. Louis Levin & Son, Inc., 782 E. Pico Blvd., Los Angeles 21, California.

Designed to hold small drills in precision collets. Absence of a sliding quill guarantees extreme sensitivity with finger-tip control. A mounted ⅛″ capacity drill chuck can also be used.

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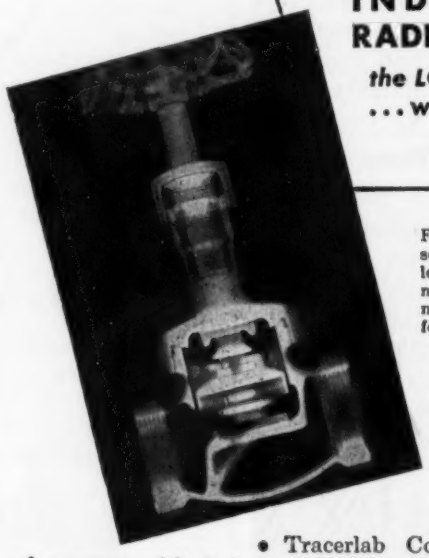

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chambers. Running through the middle of the chamber is a rectangular refractory tube holding a boat of lithium compound.

When the chamber is heated, the compound is vaporized and the lithium vapor is picked up by the products of combustion which enter the tube and are carried into the furnace. As lithium vapor mixes with the product of gas combustion, a high degree of atmosphere control is provided.

Changes Scale

Lithium not only inhibits additional oxide formation on the castings but also tends to change the character of the scale which was on the metal when it was put in the furnace, making it relatively soft, thin, and flaky.

With annealing completed, castings are in a better condition for cleaning. The operation now requires only five to eight passes for cleaning the same parts, a 50 pct reduction in cleaning time.

Issue Filler Metal Specs

Specifications for brazing filler metal have been issued by the American Society for Testing Materials. This brings to eight the total of filler metal specifications in this new field.

The specifications cover every type of brazing filler metal in common use today. The 33 different classifications are divided into groups according to principal constituents. They include classifications for aluminum-silicon; copper-phosphorous; silver; copper-gold; copper and copper-zinc; magnesium; and heat-resisting filler metals.

ASTE Plans Basic Tool Research

A basic research program in tool engineering has been started by the American Society of Tool Engineers. Initial grant for the program is $75,000. Education and advanced production know-how, which will be promoted by the program, are vital keys in maintaining our standard of living, the Society feels.

Turn Page

DUST CONTROL:

Modern control devices keep shops cleaner, cut maintenance costs.

Dust control in every shop is a continuous daily problem. Airborne dust may cause temporary damage to workpieces, machinery, and may contribute to corrosion. Presence of too much dust usually indicates existing dust removal equipment is not sufficiently effective or may not be cared for properly.

The basis for dust control may be boiled down to a knowledge of the proper equipment to be used, and continued practice of proven maintenance routines.

How Pure Air

In most dust-recovering systems the desired degree of air purity and shop cleanliness requirements usually determines the air-cleaning system to be used as well as the amount of maintenance needed to keep the system in good running order.

The various systems may be divided, therefore, according to the quantity and quality of the dust to be collected and removed and the type of process best adapted for the job.

Regardless of the system selected, servicing requires familiarity with the performance characteristics of the components of the entire dust-collecting equipment.

Dust Collectors

Dust should not be discharged directly out-of-doors. Various devices are used to separate the dust from the air. These take the form of filters, dust-separating fans, cyclones, (centrifugal separators), settling chambers, wet air scrubbers, and electrostatic precipitators.

Cyclone-dust separators slow down the velocity of dust-laden air by a tangential whirl. As the velocity becomes materially reduced, the air cannot carry the dust and the latter gradually settles into the collector below. Such systems are fairly effective and are commonly used to handle sawdust, grinding and buffing materials.

For particles not too fine, combination exhaust fans and separators often function in one device and perform satisfactorily. Fans are of the centrifugal type with various forms of wheels and numbers of blades.

Discharge Fans

Fans are usually placed on the discharge end of the dust-collecting system. If the characteristics of the matter are such that it may drop out of the air before reaching the fan, the separating unit is usually placed on the inlet side of the fan.

Some shops use rubber liners to reduce wear and noise. In many cases, it is advisable to raise the precipitation efficiency of the dust by spraying water in the entering air.

Wet cyclone collectors need plenty of clean water to obtain maximum efficiency. Wherever recirculation is part of the equipment, the operation of the settling tank can be efficient only with the use of clean spray nozzles. Swirl vanes, elimination plates and impeller blades must be clean. Properly constructed pumps should be used to flush the piping system clean.

In dry-type dust filters the dust-laden air passes through a screen of spun glass, cloth, cellulose paper or felt, single or multiple type. Here dust is removed by straining and usually a low-velocity air is calculated to pass through.

Newer Methods

In electrostatic precipitators dust-laden air passes between electrodes, one of which is charged at high voltage and the other grounded. Dust particles are driven to grounded electrodes.

Latest in dust removal techniques is use of high-frequency sound waves. Ultrasonic waves will catch the finest particles of dust which float in the air but cannot be caught otherwise. Experiments indicate the scavenging ability of this process can be carried further than through any mechanical process.

Everybody gets into the act . . . .

That's the way we want it to be, here at Claymont. Because that's the way we make sure that your order for alloy steel gets careful, individualized supervision . . . painstaking attention to every processing detail right from the front office, through our laboratories, down to the men who roll your steel.

Let us show you how our *personal touch* assures you of alloy steels that are truly tailored to your specialized requirements.

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THE COLORADO FUEL AND IRON CORPORATION

CF&I

Vigorous Demand Still Showing No Sign of Slipping

Steel people raise their estimates of market strength . . . All signs still point to continuing high level of business . . . Operations hold at 101.5 pct of capacity fourth week.

The vigor and duration of steel demand are causing market forecasters to raise their sights. Even steel producers, historically conservative in their market appraisals, are beginning to look past the midyear barrier without seeing anything to derail the steel express.

In the past 2 weeks presidents of two middle-sized steel companies have predicted near capacity operations for the balance of 1953. Although they spoke only for their own companies, it is obvious they could not hope to keep operating at capacity while the rest of the industry slumped.

Staying Ahead . . . It is equally obvious that if steel supply were to overtake demand by midyear signs of easing would be showing up now. Yet order books of most producers still show backlogs of close to 5 months on nearly all products.

It is doubtful that the views of these two steel men are as divergent from other industry opinions as they appear at first glance. Steel leaders making more conservative forecasts of capacity operations "through the first half" are talking about a lead pipe clinch. It is generally conceded that first half business is in the bag. Even the most conservative steel leaders do not expect the bottom to drop out of the market in the second half. More than one has pointed out that a modest decline from breakneck production rates (if it comes) might not be so bad.

Watch These . . . Big order backlogs are not a sure sign of booming business in the months ahead. Orders can be and have been cancelled right and left at first sign of trouble. Things to watch in the steel maket are (1) inventories, (2) cancellations, (3) rate of new orders, and (4) business prospects of steel consumers (manufacturers).

Inventories of steel consumers, though generally growing slowly, are still on the lean side and badly unbalanced. In Detroit terrific auto production schedules have kept steel stocks low; some firms are operating practically on a hand-to-mouth basis.

Won't Cancel . . . Cancellation of steel orders is practically unheard of. In addition to high manufacturing schedules, likelihood of steel price increases about midyear is keeping buying pressure strong. If prices go up no consumer wants to get caught with his inventory down.

Rate of new orders can not be too meaningful as long as demand is so strong that consumers will fill order books as far ahead as mills will open them. Mills are reluctant to book too far ahead, especially since they don't know what will be done with advance allotments after CMP expires June 30.

Still Get Premiums . . . When steel production starts catching up with demand marginal or high cost mills will no longer be able to book business at premium prices. So far, with one exception, they haven't had any trouble.

Business prospects of most major steel-using groups seem brighter than they did a few months ago. Production schedules are generally being increased. Some decline in auto output is to be expected in the second half, but right now this is the hottest steel-using industry in the country.

Spelling Out Demand . . . Hot and cold-rolled sheets have joined large bar, heavy plates and structurals, nickel stainless, and oil country goods in the tightest category. Light plates and structurals are a little easier.

Restrictions on production and sale of nickel-bearing steels are so tight that no true, free market evaluation will be possible for many months. Meanwhile, chrome stainless steels are showing surprising strength, due largely to use as alternates for nickel stainless.

Wire products, including nails, staples and fencing are in adequate supply. Some specialty wire products are still staying on the tight side.

Still Waiting . . . The government still has not answered steel and aluminum industry demands for clear-cut expression of policy on controls after June 30. Industry wants to be reassured that it will not have to keep filling advance CMP allotments after CMP expires June 30.

May Enter Plastics . . . Some steel firms may find themselves in the plastics business before too long, if present development work is as successful as anticipated.

Several big producers have taken options on a new process for producing plastic pipe reinforced with glass fibers. After 2½ years of engineering the developer of the process has been producing the centrifugally cast thermosetting plastic pipe since last June.

Steelmaking operations this week are scheduled at 100.5 pct of rated capacity, unchanged from the past 3 weeks.

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UNITED STATES STEEL

Market Briefs and Bulletins

Build Giant Furnace . . . Construction of what is reported to be the world's largest merchant iron blast furnace will start immediately at American Steel & Wire's central furnaces and docks plant in Ohio's Cuyahoga River Valley. The furnace, which will have a capacity of 1350 tons a day, will be 106 ft high and have a 26-ft hearth.

Magnesium Up . . . Effective Monday, Mar. 9, the price of primary magnesium ingot was moved up 2½¢ to 27¢ per lb by the Dow Chemical Co. Alloy ingots were boosted 2¢ and sticks and turnings 3¢. Sheet, extrusions and anodes are also 3¢ higher. Increasing production costs were cited as the reason for the price hike.

Mill Expansion Possible . . . Annual report of an electric mill in the Detroit area indicates that a possible $100 million expansion program may still be effected. Company's certificate of necessity does not expire until later this year.

Help Small Firms . . . Modification of an agreement between the Veterans Administration and the Small Defense Plants Administration may result in more business for small firms. The modification provides that proposed VA procurements of $10,000 or more will be screened jointly by SDPA and the VA to select those that can be filled by small firms. Formerly only procurements of $25,000 or more could be screened in this manner.

Capacity Mounts . . . In the last 14 years, the number of U. S. steel plants has grown from 128 to 143, reports American Iron & Steel Institute. Steel capacity in 1953 is rated at 35,718,512 tons more than in 1939. Among the states, Pennsylvania shows the greatest increase (7,101,238 tons more) for the period. Ohio is next with an increase of 5,100,525 tons.

Want Silicon Sheet . . . Silicon sheet is moving well in the Midwest. Demand is believed partly due to increased needs of air conditioning manufactureres who are expanding production (story on stepped up production in air conditioning will be in next issue of THE IRON AGE).

Open Detroit Plant . . . Bliss & Laughlin's new steel fabricating plant in Detroit will be ready for production early in April. The new plant is equipped to produce rounds, squares and hexagon shapes from ⅜ to 3 in. Flat bars will be produced at a later date. Cost of the plant which is the company's fourth was $1.5 million.

Price Increase . . . U. S. Steel Corp. announces price increases of stainless steel grades effective Feb. 28. The boosts amount to 3 pct in the 300 series and 2 pct in the 400 and 500 series. OPS granted the rises to reflect increases in cost of chrome and nickel.

Producing New Steel . . . Jones & Laughlin Steel Corp. is producing a new free-machining steel by the open-hearth process. Designated the J & L 1200 Series, the new steel is comparable to AISI 1200 Series and meets specifications of SAE 1100 series. It is sold in the form of C-F bars.

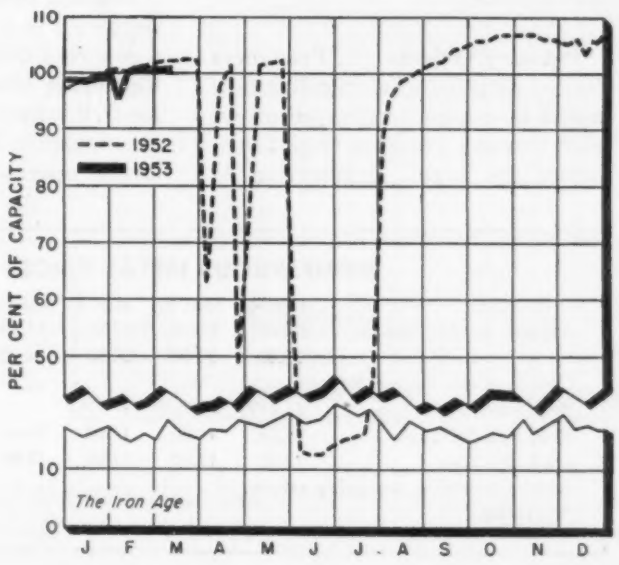
Foundry Orders Dip . . . Value of new orders for foundry equipment in January was estimated at $1,379,130 by Foundry Equipment Manufacturers Assn., on the basis of reports from 26 manufacturing firms. This total is below the more than $1.5 million new order rate of December, 1952.

STEEL OPERATIONS

District Operating Rates

District	Week of Mar. 8	Week of Mar. 1
Pittsburgh	107.0	107.0*
Chicago	103.5	102.0
Philadelphia	96.0	96.0
Valley	102.0	102.0*
West	105.0	103.0*
Cleveland	95.0	97.0*
Buffalo	94.0	94.0
Detroit	105.0	107.0*
Birmingham (South)	98.0	98.0
Wheeling	101.0	101.0*
South Ohio River	92.5	92.5
St. Louis	87.0	96.0
East	93.0	90.5*
Aggregate	**100.5**	**100.5**

Beginning Jan 1, 1953, operations are based on annual capacity of 117,522,470 net tons.
* Revised



Aluminum Stockpile Question Arises

ODM schedules meeting to discuss resumption of aluminum stockpiling . . . Industry opposes it at this time . . . Copper prices still unsettled . . . Lead, zinc off—By *R. L. Hatschek.*

Aluminum stockpiling, long the subject for dispute between producers and the government, is up for discussion again this week at an Office of Defense Mobilization meeting in Washington.

Stockpiling has been slow for the past year or more as a result of the high demand while the industry's capacity was being expanded. For the past few months the drought-caused shortage of electrical power has prevented full production — keeping the market tight and eliminating any possibility of putting aluminum into the nation's strategic reserve.

Power On . . . But now the rains have again made power available and potlines are being fully utilized. Production is back to normal. Marketwise, there are even signs of softening in items like foil, cable, tubing, powder, paste and some extrusions. This is definitely not true of items like sheet and strip.

With conditions approaching a more normal balance the stockpilers immediately want to stash ingot away.

Industry Objects . . . Producers feel resumption of stockpiling now would be too soon. They point out high demand pressure from fabricators for ingot. Resumption of stockpiling at a time when supplies are beginning to loosen would be too much of a blow, it's felt.

The industry believes it would be preferable to hold off until the market for aluminum is really well balanced—sometime in the second quarter most probably.

Copper Prices . . . Early this week there was little change in copper prices—they're all over the lot. The range of 27½¢ to 34¢ was set on Monday with some on a "price at time of shipment" basis. The Lake copper price was established at 32⅛¢ on Monday.

Some custom smelters came back into the market for copper scrap late last week moving the quotations back up to earlier levels. No. 1 copper wire was going in the range of 28½¢ to 29¼¢ per lb, No. 2 copper wire at 26½¢ to 27¢ and light copper was selling at 25¢ to 25½¢.

Dealers maintained their quotations at previously listed prices and brass mill scrap continued at the same spread.

Foreign Doings . . . Negotiations were still in progress this week on a reported deal for 10,000 tons of Rhodesian blister copper destined for U. S. consumers, not the strategic stockpile. The deal is part of a larger operation that may bring the U. S. some 100,000 tons of the Rhodesian copper.

About 8000 tons have already been sold to the U. S. Perhaps 30,000 tons in all may be made available to countries other than the U. K. during the first half. The 8000 tons already sold here and another 2000 tons already sold elsewhere are included in the 30,000-ton figure.

Cut Lead, Zinc . . . There was some price reshuffling last week in metals besides copper and brass. Lead was reduced ½¢ per lb to 12.80¢ on a St. Louis basis and 13.00¢ at New York. This action followed a decline in London of about ⅝¢. London turned a bit firmer toward the end of the week and on Friday was at the New York equivalent of 13.12¢ including duty. Demand in the U. S. continued moderate according to members of the trade.

Zinc was reduced ¼¢ to 11.00¢ per lb at East St. Louis and 11.83¢ at New York. This is the lowest price for zinc since before the start of trouble in Korea. Light demand from consumers plus a general softness both in London and on the commodity exchange were the factors behind this reduction.

Zinc Shipments Slip . . . Slab zinc shipments for February totaled only 71,710 tons—this is about 5000 tons less than the previous month and is the lowest total since the steel strike last summer. And unfilled orders declined some 2500 tons to boot. These stood at 37,172 tons at the beginning of this month.

As a result of the decreased shipments and in spite of a production cut of about 5000 tons due to the shorter month, smelters stocks of slab zinc rose about 5000 tons to 93,664 tons, according to American Zinc Institute statistics. Average daily production was high —2746 tons—making the February total 76,899 tons.

NONFERROUS METAL PRICES

	Mar. 4	Mar. 5	Mar. 6	Mar. 7	Mar. 9	Mar.10
Copper, electro, Conn.	27.50-32.00	27.50-32.00	27.50-32.00	27.50-32.00	27.50-34.00	27.50-34.00
Copper, Lake, delivered	....	....	....	....	32.125	32.125
Tin, Straits, New York	$1.21½	$1.21½	$1.21½	....	$1.21½	$1.21½*
Zinc, East St. Louis	11.25	11.00	11.00	11.00	11.00	11.00
Lead, St. Louis	12.80	12.80	12.80	12.80	12.80	12.80

Note: Quotations are going prices.
*Tentative.

How a Monel Pickling Chain made a comeback

...after 6 years in a hot Sulphuric Bath!

At Youngstown Welding & Engineering Co., new Monel links are welded into this Monel chain which had been attacked at the acid level after six years in hot sulphuric pickling bath. Reconditioning Monel pickling equipment after years of service saves in replacement costs.

Corrosion attacks pickling equipment viciously at the acid level – the zone where acid meets air.

So the owners of a wrought Monel® chain learned . . . when after six years of service they found the links at this point were gradually being destroyed. As the rest of the chain was in good condition they decided to have it reconditioned and the weak section replaced. At the Youngstown Welding & Engineering Company where the corroded section was cut out, new links of Monel were welded in with an oxy-acetylene torch.

Now the chain is back, ready for many more years of service.

Pickling chain is only one example of where Monel equipment fabricated by Youngstown Welding & Engineering Co. can give extra-long service life . . . and can then be reconditioned for additional years of use.

Strong, corrosion-resisting Monel can help you obtain substantial savings in replacement and maintenance costs in all types of pickling equipment . . . crates, hooks, tie-rods, racks. And because Monel is so strong, you can have lighter equipment which means increased payloads.

"Where Monel Pays Its Way in PICKLING," has been specially prepared to show you how useful Monel can be. Why don't you write for your free copy, now?

Be sure to consult your Distributor of Inco Nickel Alloys for the latest information on availabilities from warehouse and mill. Remember, too – it always helps to anticipate your requirements well in advance.

Here's how the chain section at the acid level looked after six years of service. These original links were flash welded. Replacement links are formed from Monel rod and gas welded.

Here's how the chain looked after the corroded links had been cut out and new Monel links were welded in by oxy-acetylene torch. Now it is ready for many more years of rugged duty.

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Railroad Scrap Grades Gather Steam

Demand for premium grades of scrap is strong . . . Secondary grades slip off in some centers . . . Railroad scrap up in Pittsburgh, Cleveland, Cincinnati . . . Mills need quality scrap.

Some mills are hawk-eyed when it comes to inspecting carloads of secondary openhearth and blast furnace scrap. Meanwhile premium grades of steel ride high in popularity. In some scrap centers railroad grades rallied in price this week but No. 2 bundles and turnings slipped.

Railroad specialties in Pittsburgh were up $3 and in Cleveland, bidding on railroad lists jumped prices of 3 ft rails by $9 and 18 in. crops by $7. Rails, random length and 18 in. crops climbed $3 in Cincinnati while in Chicago and Philadelphia railroad grades continued to show their strength.

Scrap men report many mills are in need of quality grades of scrap to balance out large stocks of secondary material. Although trading in No. 1 heavy melting as such is low in several centers, a few scrap men believe that once the edge is off mill appetite for premium steel, No. 1 heavy melting may be restored. In some areas this will be done merely by reclassification.

Pittsburgh—A phenomenon of the current market is the virtual disappearance of No. 1 heavy melting steel, as such. Dealers, brokers, and consumers agree that bulk of this material carries the label "low phos" and moves as such. Some of it meets the "low phos" spec, some doesn't. Consumers meanwhile say they will pay no more than the old ceiling for No. 1 steel labeled as No. 1. THE IRON AGE price of $45 delivered is pegged on going price for No. 1 bundles. Blast furnace and cast grades are weaker, railroad specialties up $3.

Chicago—Speculation in No. 1 bundles continued last week, though market activity was generally slow. Clippings continued high. Mills were holding off, but it appeared that No. 1 bundles were bringing better than ceiling prices from brokers. Turnings declined. Railroad items were still a premium grade, but a lot of the earlier optimism is departing. A mill purchase this week stabilize steel making grade.

Philadelphia—Question of No. 1 steel vs. low phos is still keeping this market unsettled but some new business early this week pegs No. 1 steel at $43.50 to $44.50. Railroad grades have picked up strength while cast items show softness.

New York—Bulk of prime heavy melting scrap shipments are going as OPS Grade 17. To cover this situation, low phos, 2 ft and under is included this week in New York prices at $42. No. 2 bundles are selling at a range of $34 to $36. Demand for premium grades of steel is good. That's because some mills were glutted with No. 2 material. Secondary grades show signs of weakness. Turnings were slightly off. Cast stays dull.

Detroit—Bulk of scrap here is being directed at former ceiling levels. However, there is evidence that dealers, by buying sheet clippings, are attempting to force the price to what they feel it should be on a free market. Cast has weakened slightly in price. Blast furnace grades are weakening and the trade feels it won't be long before they drop much lower. No. 1 heavy melting is unheard of.

Cleveland—Crack down on No. 2 bundles has started in this area. Very stiff inspection is reflected by a $2 drop in that item to $41.50. Bidding on railroad lists jumped 3-ft rails up $9 to $62 while 18--in. crops moved up $7 to $64. Hold-the-line policy is keeping No. 1 heavy melting down at ceiling and some mill buyers say upgrading will soon cease. When that happens the "Marriage of the Grades" will be over. Handling of orders on a straight delivered basis is expected to start after Mar. 27.

Birmingham—Largest and second largest steel scrap buyers in the South were back in the market this week with fair-sized orders at new delivered prices below former ceilings. Barges were reported depressing the market early in the week by offering prices $2 to $4 lower, but were caught loaded when one of the mills suddenly stopped buying. Some dealers are refusing to deal with the barges, saying efforts to depress prices might dry up their sources of supply and eventually cause a shortage.

St. Louis—Watchful waiting on developments in other markets and the availability of scrap is the general attitude here. Mill receipts continue to exceed consumption and purchases have been small. Some purchases by brokers are being diverted to the Chicago market. Cast iron grades continue dull.

Cincinnati—Rails appear to be the only strong item in the Cincinnati market. Random lengths and 18-in. crops both jumped $3 to $53 and $60 respectively. Cast and turnings are still moving slowly but the weakness hasn't resulted in any drop in prices. No. 2 bundles are moving at ceiling. Dealers and brokers here believe they will be able to keep a firm floor under prices at least until July.

Buffalo—Unconfirmed reports of steelmaking grades of scrap moving at levels $5 above old controlled prices startled the trade during week. Dealers and mills, even those supposedly participating, denied such business. A mill consumer reported that it had no intention at this time of breaking away from old controlled prices. Apparently rumors started when some No. 1 heavy melting material was available at about $2 a ton more.

Boston—No. 1 bundles have suddenly come into heavy demand from mills with a resultant hike in prices. New quotation is a range of $34.17 to $36.17. Turnings grades show a slight weakness in price and cast remains pretty much the same—becalmed.

West Coast—Mill buying is somewhat improved but still below normal. Much tonnage still moves at older, higher prices. No. 3 bundle classification is due for revival but dealers will have opportunity to unload galvanized. Price will probably be about $4 under No. 2 bundles. No major price changes and none in prospect in near future.

The Clearing House

NEWS OF USED AND REBUILT MACHINERY

Wait for Decontrol . . . Conversations between Detroit used and rebuilt machinery dealers usually concern two topics—the current business slump and the prospect of decontrol. And many dealers are beginning to believe that imminence of price decontrol is hurting the market.

Suspicion is reported, that some dealers and shop owners with good late model equipment on hand are holding these machines in hope of getting a better price when controls are abandoned.

Reports Conflict . . . The amount of hoarding that is going on is difficult to determine. Some dealers state emphatically that nobody is holding back on machinery, but others say it is an even more common practice than is generally suspected. Overall, there are probably not too many dealers or shop owners keeping good machinery under wraps, but there is little doubt that the prospect of decontrol is slowing the market.

Wait for More . . . It is obvious that prices of used machinery will be decontrolled. It is equally apparent that some types of used tools can bring a much higher price on a free market than is possible under Office of Price Stabilization ceilings.

One dealer estimates that Bridgeport mills, which at present command $1700 at book price, could be sold for $4000 on a free market. The price differential is sufficient to cover storage charges for a lengthy period.

Lull Continues . . . Whatever the reason for the business slump, Detroit used tool men are as unhappy about it as dealers in any section of the country. Sales have been exceptionally low for the last 90 days.

At first, the sluggish sales pace was attributed to a natural year-end lull, but as the market remained dead through January and February, dealers have become seriously concerned.

Only late model equipment is in strong demand. There is almost no retooling being done in the Detroit area, and since most industries are booming, good tools are being kept in production.

Won't Press Decontrol . . . Price controls were a major consideration at the February meeting of the Detroit Chapter of the Machinery Dealers National Assn. The chapter agreed to follow a wait-and-see policy and decided not to press for decontrol of prices.

Problem Is Solved . . . Recent suspension of Ceiling Price Regs. 93 and 34 should make life easier for dealers in the electrical equipment field who do rewinding and repair work. There has been confusion about which regulation covered electric motor repairs, but suspension of both regulations eliminates this dilemma.

Commenting on these suspensions in a bulletin, National Industrial Service Assn. reminded its members they still must keep the invoice records specified in Ceiling Price Reg. 105, which covers certain types of used machinery. NISA expects that this regulation will be dropped very shortly. It will have to be abandoned by Apr. 30 in any case.

However, all records called for by Ceiling Price Reg. 105 must be preserved for 2 years from date of sale of machinery covered by the regulation.

Want M-101 Continued . . . National Production Authority's Industry Advisory Committee on Used Machine Tools met Mar. 4 and recommended that Order M-101 requiring inventory reports on certain types of machine tools be continued until NPA is disbanded.